

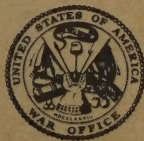
DEPARTMENT OF THE ARMY  
TECHNICAL MANUAL

TM 11-2586

DEPARTMENT OF THE AIR  
FORCE TECHNICAL ORDER

TO 31SI-2TIQ2-1

PUBLIC  
ADDRESS SETS  
AN/TIQ-2, AN/TIQ-2A  
AND AN/TIQ-2B



DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
NOVEMBER 1955

## **WARNING**

### **DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT**

Be careful when working on the 400-volt plate and power supply circuits, or on the 115-230-volt ac line connections.

**DON'T TAKE CHANCES!**



CHANGE }  
No. 9 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 19 February 1974

**Operator's, Organizational, Direct Support, General Support,  
and Depot Maintenance Manual  
Including Repair Parts and Special Tools Lists**

**PUBLIC ADDRESS SETS AN/TIQ-2,  
AN/TIQ-2A, AND AN/TIQ-2B**

TM 11-2586/TO 31S1-2T1Q2-1, 29 November 1955, is changed as follows:

*Page 3, paragraph 1.* Delete subparagraph *c.*

*Paragraph 1.1.* Delete paragraph 1.1 and substitute:

**1-1. Indexes of Publications**

*a. DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

*b. DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

*Paragraph 2.* Delete paragraph 2 and substitute:

**2. Forms and Records**

*a. Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

*b. Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps), and DSAR 4145.8.

*c. Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF

361) as prescribed in AR 55-38 (Army)/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A (Marine Corps), and DSAR 4500.15.

## 2.1. Reporting Equipment Publication Improvements

The Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028, Recommended Changes to Publications, and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

Page 9, paragraph 7. Change paragraph heading "Table of Components" to read "Components and Dimensions."

Page 10. After paragraph 7 add:

## 7.1. Items Comprising an Operable Equipment

FSN	Qty	Nomenclature, part No., and mfr code	Usable on code
<p align="center"><b>NOTE</b></p> <p>The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency; etc.</p> <p align="center"><b>NOTE</b></p> <p>Number 1 in the usable-on code column refers to AN/TIQ-2; number 2 refers to AN/TIQ-2A; number 3 refers to AN/TIQ-2B</p>			
7740-222-3472	2	Album, Record, Disk: 5-10; 85351	1,2,3
7740-222-3471	1	Album, Record, Disk: 5-12; 85351	1,2,3
5830-164-6626	1	Amplifier, Audiofrequency AM-20, A, B/TIQ-2; 71-3023 (NX); 81349.	1,2,3
5995-163-0017	1	Cable Assembly, Special Purpose, Electrical CX-51/TIQ-2; SC-D-19384; 80063.	1,2,3
5995-160-3921	1	Cable Assembly, Power, Electrical CX-53/TIQ-2 SC-D-19385; 80063.	1,2,3
5995-160-3902	1	Cable Assembly, Power, Electrical CX-54/TIQ-2; SC-D-19387; 80063.	1,2,3
5995-160-3979	1	Cable Assembly, Power, Electrical CX-55/TIQ-2; SC-D-19388; 80063.	1,2,3
5995-244-2260	2	Cable Assembly, Special Purpose, Electrical CX-1833/U; SC-D-27400; 80063.	2,3
5995-548-3710	2	Cable Assembly, Special Purpose, Electrical CX-3094/U; SC-C-97927; 80063.	1,2,3



FSN	Qty	Nomenclature, part No., and mfr code	Usable on code
5995-162-7157	2	Cord Assembly, Electrical CX-49/TIQ-2; SC-D-19382; 80063.	1,2,3
6625-170-9608	1	Cord Assembly, Electrical CD-605; SC-A-7999; 80063.	1,2,3
6625-224-5193	1	Disk, Stroboscope; 610; 96739	1,2,3
5965-164-7259	2	Headset HS-30; 71-1518 (NX); 81349	1
5965-164-7259	1	Headset HQ-30; 71-1518 (NX); 81349	2,3
5965-243-4082	2	Horn, Loudspeaker; 58S10; 87771	1,2,3
5965-128-2983	2	Loudspeaker, Permanent Magnet LS-103, A, B/TIQ-2; SC-DL-16546 (NX); 80063.	1,2,3
5965-161-6432	2	Loudspeaker Stand MT-128/TIQ-2; SC-D-17455; 80063	1
5965-498-8177	2	Loudspeaker Stand MT-128A/TIQ-2 and MT-128B/TIQ-2; SC-DL-14062; 80063.	2,3
5965-257-1450	1	Microphone, Dynamic M-30, A/U; 8219 (NX); 87771.	1,2,3
5965-295-8965	1	Microphone, Dynamic M-43/U; M-43/U (NX); 81349.	1,2,3
5965-160-2531	2	Microphone Stand MT596/U; 71-3023; 81349	1
5965-242-6570	2	Microphone Stand MT-596A/U and MT-596B/U; SC-C-19610; 80063.	2,3
5985-255-6102	2	Reel, Antenna; RL-3; SC-DL-24226; 80063	1,2,3
5835-243-0594	1	Stylus, Reproducing; A-3N; 70638	1,2,3
5835-243-0595	1	Stylus, Sound Reproducing; M-27-1M; 70638	1,2,3
5835-128-8762	1	Turntable, Reproducer MX-39/TIQ-2 and MX-39A/TIQ-2; SC-D-22200; 80063.	1,2,3
5830-284-0227	1	Vibrator Power Supply PP-31/TIQ-2; PP-31A/ TIQ-2; PP-31B/TIQ-2 and PP-31C/TIQ-2; 71-3212(NX) 81349.	1,2,3
6145-161-0790	200	Wire WD-1/TT; WD-1/WTT; 81349	1,2,3

Page 122, appendix B. Delete appendix B and substitute:

## APPENDIX B

### BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

#### Section I. INTRODUCTION

##### B-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Public Address Sets AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B.

## B-2. General

These basic issue items and items troop installed or authorized lists are divided into the following sections:

*a. Basic Issue Items List—Section II.* A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

*b. Items Troop Installed or Authorized List — Section II.* Not applicable.

## B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

*a. Illustration.* This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* Not applicable.

*b. Federal Stock Number.* Indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

*c. Part Number.* Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

*d. Federal Supply Code for Manufacturer (FSCM).* The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency; etc., and is identified in SB 708-42.

*e. Description.* Indicates the Federal item name and a minimum description required to identify the item.

*f. Unit of Measure (U/M).* Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr; etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

*g. Quantity Furnished with Equipment (Basic Issue Items Only).* Indicates the quantity of the basic issue item furnished with the equipment.



Quantity Authorized (Items Troop Installed or Authorized Only). Not applicable.

#### B-4. Special Information

Usable-on codes are included in column 5. Uncoded items are applicable to all models. Identification of the usable-on codes are as follows:

Code	Used on
1	AN/TIQ-2
2	AN/TIQ-2A
3	AN/TIQ-2B

### SECTION II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description	(6) Unit of meas	(7) Qty furn with equip
(A) Fig. No.	(B) Item No.				Usable on code		
3		5830-404-7266	SC-DL-22232	80063	CASE: CY-37/ TIQ-2; CY-37A/ TIQ-2	1,2,3 ea	1
3		5830-503-1641	SC-DL-12714	80063	CASE: CY38/ TIQ-2	1 ea	3
3		5830-503-1641	SC-DL-12714	80063	CASE: CY38/ TIQ-2	2,3 ea	2
		5865-164-7265	SC-D-5978	80063	MICROPHONE COVER: M-367.	1,2,3 ea	2

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS  
General, United States Army  
Chief of Staff

Official:

VERNE L. BOWERS  
Major General, United States Army  
The Adjutant General

Distribution:

Active Army:

USASA (2)  
 CNGB (1)  
 ACSC-E (2)  
 Dir of Trans (1)  
 COE (1)  
 TSG (1)  
 USAARENBD (1)  
 USAMB (10)  
 AMC (1)  
 TRADOC (2)  
 ARADCOM (2)  
 ARADCOM Rgn (2)  
 OS Maj Comd (4)  
 LOGCOMDS (3)  
 MICOM (2)  
 TECOM (2)  
 USACC-EUR (5)  
 AVSCOM (2)  
 USACC (4)  
 MDW (1)  
 Armies (2)  
 Corps (2)  
 HISA (ECOM) (18)  
 Svc Colleges (1)  
 USASESS (5)  
 USAADS (2)  
 USAFAS (2)  
 USAARMS (2)  
 USAIS (2)  
 USAES (2)  
 USAINTS (3)  
 USAAVNS (2)  
 USAOC&S (2)  
 USAQMS (2)  
 USAMPS (2)  
 USATSCH (2)  
 USACSS (2)  
 WRAMC (1)  
 USACDCEC (10)  
 ATS (1)  
 USAWC (2)

Instl (2) except:

Fort Gordon (10)  
 Fort Huachuca (10)  
 Fort Carson (5)  
 Ft Richardson (ECOM Ofc) (2)  
 WSMR (1)

Army Dep (2) except:

LBAD (14)  
 SAAD (30)  
 TOAD (14)  
 ATAD (10)

USA Dep (2)

Sig Sec USA Dep (2)

Sig Dep (2)

Sig FLDMS (1)

USAERDAA (1)

MAAG (1)

USARMIS (1)

Arsenals (2)

USAJFKCENMA (2)

USAH (2)

AAF (1)

Units org under fol TOE

(1) copy each:

7	19-57
11-97	19-87
11-98	19-217
11-117	19-247
11-127	19-500
11-158	29-1
11-302	29-11
11-500 AA-AC	29-134
12-32	29-136
12-107	33-500
17	37
17-52	41-2
19-35	51-2
19-36	
19-37	
19-47	

NG: State AG (3); Units same as Active Army

USAR: None

For explanation of abbreviations used, see AR 310-50.









CHANGE }  
No. 9 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 19 February 1974

**Operator's, Organizational, Direct Support, General Support,  
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AN/TIQ-2A, AND AN/TIQ-2B**

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*Page 9, paragraph 7.* Change paragraph heading "Table of Components" to read "Components and Dimensions."

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5995-160-3902	1	Cable Assembly, Power, Electrical CX-54/TIQ-2; SC-D-19387; 80063.	1,2,3
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5965-161-6432	2	Loudspeaker Stand MT-128/TIQ-2; SC-D-17455; 80063	1
5965-498-8177	2	Loudspeaker Stand MT-128A/TIQ-2 and MT-128B/TIQ-2; SC-DL-14062; 80063.	2,3
5965-257-1450	1	Microphone, Dynamic M-30, A/U; 8219 (NX); 87771.	1,2,3
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5965-242-6570	2	Microphone Stand MT-596A/U and MT-596B/U; SC-C-19610; 80063.	2,3
5985-255-6102	2	Reel, Antenna; RL-3; SC-DL-24226; 80063	1,2,3
5835-243-0594	1	Stylus, Reproducing; A-3N; 70638	1,2,3
5835-243-0595	1	Stylus, Sound Reproducing; M-27-1M; 70638	1,2,3
5835-128-8762	1	Turntable, Reproducer MX-39/TIQ-2 and MX-39A/TIQ-2; SC-D-22200; 80063.	1,2,3
5830-284-0227	1	Vibrator Power Supply PP-31/TIQ-2; PP-31A/ TIQ-2; PP-31B/TIQ-2 and PP-31C/TIQ-2; 71-3212(NX) 81349.	1,2,3
6145-161-0790	200	Wire WD-1/TT; WD-1/WTT; 81349	1,2,3

Page 122, appendix B. Delete appendix B and substitute:

## APPENDIX B

### BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

#### Section I. INTRODUCTION

##### B-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Public Address Sets AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B.

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## B-3. Explanation of Columns

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*a. Illustration.* This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* Not applicable.

*b. Federal Stock Number.* Indicates the Federal stock number assigned to the item which will be used for requisitioning purposes.

*c. Part Number.* Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

*d. Federal Supply Code for Manufacturer (FSCM).* The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency; etc., and is identified in SB 708-42.

*e. Description.* Indicates the Federal item name and a minimum description required to identify the item.

*f. Unit of Measure (U/M).* Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr; etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

*g. Quantity Furnished with Equipment (Basic Issue Items Only).* Indicates the quantity of the basic issue item furnished with the equipment.

Quantity Authorized (Items Troop Installed or Authorized Only). Not applicable.

#### B-4. Special Information

Usable-on codes are included in column 5. Uncoded items are applicable to all models. Identification of the usable-on codes are as follows:

Code

Used on

1	AN/TIQ-2
2	AN/TIQ-2A
3	AN/TIQ-2B

#### SECTION II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description  Usable on code	(6) Unit of meas	(7) Qty furn with equip
(A) Fig. No.	(B) Item No.						
3		5830-404-7266	SC-DL-22232	80063	CASE: CY-37/ TIQ-2; CY-37A/ TIQ-2	1,2,3 ea	1
3		5830-503-1641	SC-DL-12714	80063	CASE: CY38/ TIQ-2	1 ea	3
3		5830-503-1641	SC-DL-12714	80063	CASE: CY38/ TIQ-2	2,3 ea	2
		5865-164-7265	SC-D-5978	80063	MICROPHONE COVER: M-367.	1,2,3 ea	2

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS  
General, United States Army  
Chief of Staff

Official:

VERNE L. BOWERS  
Major General, United States Army  
The Adjutant General



Distribution:

Active Army:

USASA (2)  
 CNGB (1)  
 ACSC-E (2)  
 Dir of Trans (1)  
 COE (1)  
 TSG (1)  
 USAARENBD (1)  
 USAMB (10)  
 AMC (1)  
 TRADOC (2)  
 ARADCOM (2)  
 ARADCOM Rgn (2)  
 OS Maj Comd (4)  
 LOGCOMDS (3)  
 MICOM (2)  
 TECOM (2)  
 USACC-EUR (5)  
 AVSCOM (2)  
 USACC (4)  
 MDW (1)  
 Armies (2)  
 Corps (2)  
 HISA (ECOM) (18)  
 Svc Colleges (1)  
 USASESS (5)  
 USAADS (2)  
 USAFAS (2)  
 USAARMS (2)  
 USAIS (2)  
 USAES (2)  
 USAINTS (3)  
 USAAVNS (2)  
 USAOC&S (2)  
 USAQMS (2)  
 USAMPS (2)  
 USATSCH (2)  
 USACSS (2)  
 WRAMC (1)  
 USACDCEC (10)  
 ATS (1)  
 USAWC (2)

Instl (2) except:  
 Fort Gordon (10)  
 Fort Huachuca (10)  
 Fort Carson (5)  
 Ft Richardson (ECOM Ofc) (2)  
 WSMR (1)

Army Dep (2) except:  
 LBAD (14)  
 SAAD (30)  
 TOAD (14)  
 ATAD (10)

USA Dep (2)  
 Sig Sec USA Dep (2)  
 Sig Dep (2)  
 Sig FLDMS (1)  
 USAERDAA (1)  
 MAAG (1)  
 USARMIS (1)  
 Arsenal (2)  
 USAJFKCENMA (2)  
 USAH (2)  
 AAF (1)

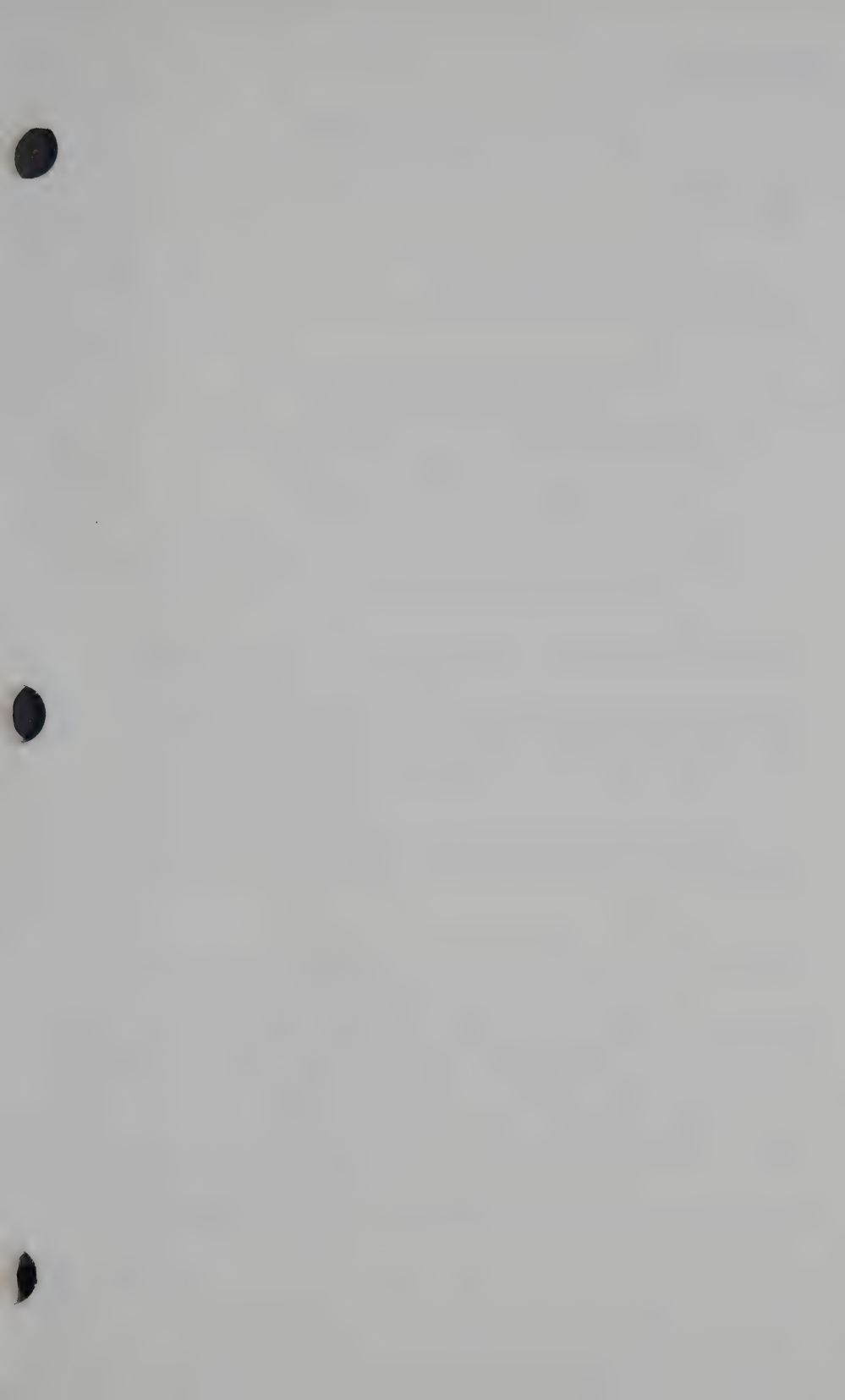
Units org under fol TOE

(1) copy each:	
7	19-57
11-97	19-87
11-98	19-217
11-117	19-247
11-127	19-500
11-158	29-1
11-302	29-11
11-500 AA-AC	29-134
12-32	29-136
12-107	33-500
17	37
17-52	41-2
19-35	51-2
19-36	
19-37	
19-47	

NG: State AG (3); Units same as Active Army

USAR: None

For explanation of abbreviations used, see AR 310-50.







(P84324)

Changes in force: C 7 and C 8

TM 11-2586  
\*C 8

CHANGE }  
No. 8 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 21 April 1967

**Operator, Organizational, DS, GS, and  
Depot Maintenance Manual  
Including Repair Parts and Special Tools List**

**PUBLIC ADDRESS SETS AN/TIQ-2,  
AN/TIQ-2A, AND AN/TIQ-2B**

TM 11-2586, 29 November 1955, is changed as follows:

The title of the manual is changed as shown above.

*Page 110, paragraph 100.7c, chart, step 2 (page 23 of C7). "Procedure" column. Add item j after item i.*

*j. Connect a 100-ohm resistor across the CARBON MICROPHONE input jack. Set the AM-20(\*)/TIQ-2 RADIO-C MIC switch to C. MIC. Note and record the TS-723A/U meter indications.*

*"Performance Standard" column. Add item j after item i.*

*j. The TS-723A/U meter should not indicate more than 2.25 volts.*

*Page 117, paragraph 108 (page 30 of C7), second line. Change "(para 100.8, step 2)" to (para 100.7, step 2).*

*Paragraph 108.3 (page 31 of C7). Delete second sentence and substitute: The vacuum tube voltmeter should indicate between a minimum of 3.0 volts and a maximum of 4.1 volts.*

*Page 122. (Page 34 of C7). Change APPENDIX I to: APPENDIX A.*

*\*This change supersedes TM 11-5830-206-20P, 20 November 1964, and TM 11-5830-206-35P, 19 November 1964.*

Delete appendix II and substitute new appendix B:

## APPENDIX B

### BASIC ISSUE ITEMS

#### Section I. INTRODUCTION

##### B-1. General

This appendix lists items for Public Address Sets AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

##### B-2. Explanation of Columns

An explanation of the columns in section II is given below.

*a. Source, Maintenance, and Recoverability Codes, Column 1.*

- (1) *Source code, column 1a.* The selection status and source for the listed item is noted here. The source code used is:

Code	Explanation
P	Applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
A	Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.

- (2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here. The maintenance code used is as follows:

Code	Explanation
C	Operator/Crew
O	Organizational Maintenance

- (3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability codes and their explanations are as follows:

*Notes.* When no code is indicated in the recoverability column, the part will be considered expendable.

*Code*

*Explanation*

*R*

Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

*b. Federal Stock Number, Column 2.* The Federal stock number for the item is indicated in this column.

*c. Description, Column 3.* The Federal item name, a five-digit manufacturer's code, a part number, and when required, the model designator (\*), which indicates different models of the end equipment, are included in this column.

*d. Unit of Issue, Column 4.* The unit used as a basis of issue e.g. ea, pr, ft, yd, etc) is noted in this column.

*e. Quantity Incorporated in Unit Pack, Column 5.* Not used.

*f. Quantity Incorporated in Unit, Column 6.* The total quantity of the item used in the equipment is given in this column.

*g. Quantity Authorized, Column 7.* The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

*h. Illustration, Column 8.*

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item or symbol number, column 8b.* Not used.



## SECTION II. BASIC ISSUE ITEMS LIST

(1) SOURCE CD	(2) MAINT. CD	(3) REC. CODE	BASIC ISSUE ITEMS LIST										(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH	(8) ILLUSTRATIONS	
			(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						MODEL	1	2	3	4	5	6	(a) FIGURE NUMBER	(a) ITEM OR SYMBOL NUMBER
A	C	R	5830-164-6622	PUBLIC ADDRESS SETS AN/TIQ-2; AN/TIQ-2A, AND AN/TIQ-2B: A portable loudspeaker system used for addressing large groups by voice, or playing records, or feeding radio received signals to the audience; 81349; 71-3023 (This item is nonexpendable.)													3	
				NOTE: Model column 1 refers to AN/TIQ-2; column 2 refers to AN/TIQ-2A; column 3 refers to AN/TIQ-2B.														
				TECHNICAL MANUAL TM 11-2586														
				Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facility.														
				NOTE: A quantity of 2 technical manuals are packed with each one hundred equipments. Where a valid need exists, additional copies may be requisitioned and kept on hand.														
P	C		7740-222-3472	ALBUM, RECORD, DISK: 85351; 5-10													2	11
P	C		7740-222-3471	ALBUM, RECORD, DISK: 85351; 5-12													1	13
A	C	R	5830-164-6626	AMPLIFIER, AUDIOFREQUENCY AM-20, A, B/TIQ-2: 81349; 71-3023 (K)													1	3
A	C	R	5995-163-0017	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-53/TIQ-2: 80063; SC-D-19384													1	9
A	C	R	5995-160-3921	CABLE ASSEMBLY, POWER, ELECTRICAL CX-53/TIQ-2: 80063; SC-D-19385													1	7
A	C	R	5995-160-3902	CABLE ASSEMBLY, POWER, ELECTRICAL CX-54/TIQ-2: 80063; SC-D-19387													1	7
A	C	R	5995-160-3979	CABLE ASSEMBLY, POWER, ELECTRICAL CX-55/TIQ-2: 80063; SC-D-19388													1	7
A	C	R	5995-244-2260	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-183/0: 80063; SC-D-27400													2	8

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BASIC ISSUE ITEMS LIST										(8)					
(1a) SOURCE CD	(1b) MAINT. CD	(1c) REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UNIT PACK	(6) QTY INC IN UNIT	(7) QTY AUTH	(8) ILLUSTRATIONS	
				(3) DESCRIPTION										(a) FIGURE NUMBER	(b) ITEM OR SYMBOL NUMBER
				(3) DESCRIPTION											
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(Page 40 of C7). Change APPENDIX III to: APPENDIX C.  
After appendix C, add appendix D:

## **APPENDIX D**

### **ORGANIZATIONAL, DS, GS, AND DEPOT REPAIR PARTS LIST**

#### **Section I. INTRODUCTION**

##### **D-1. General**

This manual contains a list of repair parts required for the performance of organizational maintenance and a list covering the corresponding requirements for direct support, general support, and depot maintenance for Public Address Set AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B.

*Note.* No special tools, test, and support equipment are required for the AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B.

##### **D-2. Explanation of Sections**

This repair parts list is divided into four principal parts:

a. *Prescribed Load Allowance List (PLA)—Section II.* The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance. This is a mandatory minimum stockage allowance.

b. *Repair Parts for Organizational Maintenance—Section III.* Repair parts authorized for organizational maintenance is included in this section.

c. *Repair Parts for Direct Support, General Support, and Depot Maintenance—Section IV.* This chart lists repair parts authorized for maintenance performance at direct support, general support and depot.

d. *Federal Stock Number Cross-Reference Index—Section IV.* This is a cross-reference index of Federal stock numbers to illustrations by figure and item number.

##### **D-3. Explanation of Columns**

An explanation of the columns in sections II through IV is given below.

a. *Source, Maintenance, and Recoverability Codes, Column 1, Sections III and IV.*

- (1) *Source code, column 1a.* The selection status and source for the listed item is noted here. Source codes and their explanations are as follows:

<i>Code</i>	<i>Explanation</i>
<b>P</b>	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
<b>A</b>	Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
<b>X2</b>	Applies to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

- (2) *Maintenance code, column 1b.* The lowest category of maintenance authorized to install the listed item is noted here.

<i>Code</i>	<i>Explanation</i>
<b>C</b>	Operator/Crew
<b>O</b>	Organizational Maintenance
<b>F</b>	Direct Support Maintenance

- (3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability codes and their explanations are as follows:

*Notes.* When no code is indicated in the recoverability column, the part will be considered expendable.

<i>Code</i>	<i>Explanation</i>
<b>R</b>	Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

*b. Federal Stock Number, Column 1, Section II; Column 2, Sections III and IV.* The Federal stock number for the item is indicated in this column.

*c. Description, Column 2, Section II; Column 3, Sections III and IV.* The model designator, Federal item name, a five-digit manufacturer's code, and a part number are included in this column. The designator (\*) indicates the different models of the

end equipment. For subsequent appearances of the same item, the manufacturer's code and part number are omitted.

d. *Unit of Issue, Column 4, Sections III and IV.* The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc) is noted in this column.

e. *Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Sections III and IV.* Not used.

f. *Quantity Incorporated in Unit, Column 6, Sections III and IV.* The quantity of repair parts in an assembly is given in this column.

g. *Maintenance Allowance, Column 3, Section II; Column 7, Sections III and IV.*

- (1) The allowance columns are divided into subcolumns. The total quantity of items authorized for the number of equipment supported is indicated in each subcolumn opposite the first appearance of each item. Subsequent appearances of the same item will have no entry in the allowance columns but will have a reference, in the description column, to the first appearance of the item. Items authorized for use as required but not for initial stockage are identified with an asterisk (\*) in the allowance column.
- (2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.
- (3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MR-NMP-CM, Fort Monmouth, N. J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.



- (4) The quantitative allowances for DS/GS categories of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

*h. One-Year Allowances Per 100 Equipments/Contingency Planning Purposes, Column 8, Section IV.* Opposite the first appearance of each item, the total quantity required for distribution and contingency planning purposes is indicated. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

*i. Illustration, Column 8, Section III; Column 10, Section IV.*

- (1) *Figure number, column 8a and 10a.* The number of the illustration in which the item is shown is indicated in this column.
- (2) *Item or symbol number, column 8b and 10b.* The callout number used to reference the item in the illustration is indicated in this column.

*j. Depot Maintenance Allowance Per 100 Equipments, Column 9, Section IV.* This column indicates the total quantity of each item authorized depot maintenance for 100 equipments. Subsequent appearances of the same item will have no entry in this column, but will have a reference in the description column to the first appearance of the item.

#### **D-4. Location of Repair Parts**

*a.* When the Federal stock number is unknown follow the procedures given in (1) through (4) below.

- (1) Locate the appropriate appendix of the repair parts list.
- (2) If the item or symbol number is available, locate the item by scrutiny of columns 8b and/or 10b of the repair parts list.
- (3) If the item, symbol, and figure number is not known check the description column (column 3) in the repair parts list to locate the part. The parts in this column are arranged in alphabetical order.
- (4) Locate the applicable illustration in this manual and note the figure number and item number. Use the repair parts listing and locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the repair part listing to find the repair part and the figure and item numbers as noted in the Index of Federal stock numbers.

### D-5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

<i>Code Number</i>	<i>Manufacturer's name</i>
02660	Amphenol-Borg Electronics Corp
08144	International Hardware Co of Canada Ltd
09736	United-Carr Fastener Co of Canada Ltd
11332	General Microwave Corp
12403	Canfield, H.O. Co of Indiana Inc
15873	Motorola Inc
22599	Elastic Stop Nut Corp of America Fastener Division
36072	Heintzman and Co Ltd
45722	Parker Kalon Div of General American Transportation Corp
49367	Pyle-National Co
56289	Sprague Electric Co
57068	Stanley Works
61864	United-Carr Fastener Corp
70638	Astatic Corp
71400	Bussmann Mfg Division of McGraw-Edison Co
71468	ITT Cannon Electric Inc
71491	Cardwell Mfg Co Inc
71785	Cinch Mfg Co and Howard B. Jones Div
72619	Dialight Corp
72962	Elastic Stop Nut Corp of America
73432	American Microphone Co Division of Electro-Voice Inc
73793	General Industries Co
75183	The Johnson Rubber Co
75376	Kurz-Kasch Inc
76545	Mueller Electric Co
77147	Patton MacGuyer Co
78189	Shakeproof Division of Illinois Tool Works Inc
78553	Tinnerman Products Inc
80063	Army Electronics Command Procurement and Production Directorate
80183	Sprague Products Co
81345	Underwriters Laboratories Inc
81349	Military Specifications
81350	Joint Army-Navy Specifications Promulgated by Standardization Div Directorate of Logistic Services DSA
83330	Herman H. Smith Inc
83624	United States Rubber International Co
85351	Basic Refractories Inc
81352	Air Force-Navy Aeronautical Specifications, Promulgated by Aeronautical Standards Group

87771 LTV University Division Ling-Temco-Vought Inc  
89373 United States Rubber Co; United States Rubber Tire Co  
94988 Chatham Electronics Div of Tung-Sol Electric Inc  
96739 Pacific Transducer Corp  
96906 Military Standard Promulgated by Standardization Div Directorate of Logistic Services DSA  
97539 Apm-Hexseal Corp  
97983 Litton Systems Inc Westrex Communications Div

# PREScribed LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	MODELS USABLE ON	(3) 15-DAY ORG. MAINT. ALLOWANCE				(4) QTY INC IN UN PK
			(A)	(B)	(C)	(D)	
			1-5	6-20	21-50	51-100	
5960-188-0883	ELECTRON TUBE: 81349; 6SL7WGT	* * *	2	5	12	22	
5960-188-3948	ELECTRON TUBE: 81349; 5U4G	* * *	2	2	3	6	
5960-223-5970	RETAINER, ELECTRON TUBE: 80063; SM-B-166142	* * *	*	*	2	2	
5960-262-0161	ELECTRON TUBE: 81349; 616WGB	* * *	2	2	4	8	
5960-273-2451	RETAINER, ELECTRON TUBE: 97983; 3T	* * *	*	*	2	2	
5960-284-5823	ELECTRON TUBE: 80028; 5R4WGB	* * *	2	2	3	6	
5975-755-6151	BOOT, DUST AND MOISTURE SEAL: 97539; N1030	* * *	*	*	2	2	
6240-057-2887	LAMP, INCANDESCENT: 80063; SM-D-135852-19	* * *	*	2	2	3	
9905-252-3748	MARKER, SELF-LUMINOUS: 81350; STRO1	* * *	*	*	*	2	
	GROUP VIII TURNTABLES MX-39, A/TIQ-2						
	NOTE: Model column 1 refers to MX-39/TIQ-2; column 2 refers to MX-39A/TIQ-2.						
5835-243-0594	STYLUS, REPRODUCING: 70638; A-3M	* * *	*	*	*	1	
5835-243-0595	STYLUS, SOUND REPRODUCING: 70638; M-27-1M	* * *	*	*	*	1	
5835-251-9138	TURNTABLE, REPRODUCER: 73793; 24432	* * *	*	*	*	1	
5835-543-0972	CARTRIDGE, SOUND REPRODUCER: 70638; 41TB	* * *	*	*	*	1	
6625-224-5193	DISK, STROBOSCOPE: 96739; 610	* * *	*	*	*	1	

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## SECTION II. PRESCRIBED LOAD ALLOWANCE LIST

PRESCRIBED LOAD ALLOWANCE								
(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	MODELS USABLE ON	(3) 15-DAY ORG. MAINT. ALLOWANCE				(4) QTY INC IN UN PK	
			(A)	(B)	(C)	(D)		
			1-5	6-20	21-50	51-100		
	GROUP I CASE CY-37A/TIQ-2 ECOM DWG NO. SC-DL-22232  NOTE: Model column 1 refers to AN/TIQ-2; column 2 refers to AN/TIQ-2A; column 3 refers to AN/TIQ-2B.							
5340-205-5159	CATCH, LUGGAGE: 80063; SC-D-20648		*	*	*		2	
5340-301-4659	KEEPER, CATCH, LUGGAGE: 80063; SC-D-20650-18		*	*	*		2	
5340-543-4091	CATCH, LUGGAGE: 15873; 335013813-1		*	*	2		2	
	GROUP II LOUDSPEAKERS LS-103, A, B/TIQ-2 ECOM DWG NO. SC-DL-16546							
5305-292-8420	THUMBSCREW: 45722; P		*	*	*		1	
5965-355-8895	COVER, LOUDSPEAKER: 80063; SC-D-83313		*	*	*		1	
	GROUP IV LOUDSPEAKER STANDS MT-128, A, B/TIQ-2  NOTE: Model column 1 refers to MT-128/TIQ-2; column 2 refers to MT-128A/TIQ-2; column 3 refers to MT-128B/TIQ-2							
5965-164-7263	MICROPHONE COVER M-367: 80063; SC-D-5978	*	*	*	*	*	1	
5965-574-6597	FOOT, MOUNTING: 80063; SC-B-14074	*	*	*	*	*	2	
	GROUP VI CASE CY-38/TIQ-2 ECOM DWG NO. SC-D-12714							
5340-680-3701	STRIKE, CATCH: 80063; SC-D-20650-27		*	2	2		3	
	GROUP VII AMPLIFIER AM-20, A, B/TIQ-2 ECOM DWG NO. SC-DL-22149  NOTE: Model column 1 refers to AM-20/TIQ-2; column 2 refers to AM-20A/TIQ-2; column 3 refers to AM-20B/TIQ-2.							
5340-200-8630	CATCH, LUGGAGE: 80063; SC-C-76220	*	*	*	*	2	2	
5340-498-9162	FASTENER, LATCH: 08144; 15795RC	*	*	*	*	2	2	
5355-160-5964	KNOB: 75376; S-308-64-BB-40269	*	*	*	*	2	2	
5920-280-4465	FUSE, CARTRIDGE: 81349; F02A250V1AS	*	*	*	2	2	3	
5920-351-7264	CAP, ELECTRICAL: 71400; 9327	*	*	*	*	*	2	
5920-351-7264			*	*	*	2	2	
5935-223-4243	COVER, ELECTRICAL CONNECTOR: 02660; 75-CCCC-1	*	*	*	*	*	1	

ANSEL-488 Form  
1 May 66 6079

AN/TIQ-2, 2A, 2B 3

NSC-PH 2475-66

SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1)		(2) REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE										(3) DESCRIPTION		(4)	(5)	(6)	(7) IS DAY ORG. MAINT. ALW.				(8) ILLUSTRATIONS	
(A) SOURCE CD	(C) MAINT. CD	(F) FEDERAL STOCK NUMBER	(M) MODEL						(U) UNIT OF ISSUE	(Q) QTY INC IN UN PK	(Q) QTY INC IN UN	(A) 1-5	(C) 2-5	(D) 51-100	(F) FIGURE NUMBER	(I) ITEM OR SYMBOL NUMBER						
			1	2	3	4	5	6														
A	C R	5830-164-6622							PUBLIC ADDRESS SETS AN/TIQ-2; AN/TIQ-2A AND AN/TIQ-2B: A portable loudspeaker system used for addressing large groups by voice or playing records, or feeding radio received signals to the audience; 81309; 71-3023 (This item is nonexpendable.)	ea						3, 4						
									NOTE: Model column 1 refers to AN/TIQ-2; column 2 refers to AN/TIQ-2A; column 3 refers to AN/TIQ-2B.													
									GROUP I													
									CASE CY-37A/TIQ-2													
									ECOM DNG NO. SC-DL-22232													
P	O	5340-543-4091							CATCH, LUGGAGE: 15873; 355013813-1	ea	7	*	*	2	2							
P	O	5340-205-5159							CATCH, LUGGAGE: 80063; SC-D-20648	ea	2	*	*	*	2							
P	O	5340-301-4659							KEEPER, CATCH, LUGGAGE: 80063; SC-D-20650-18	ea	2	*	*	*	2							
									GROUP II													
									LOUDSPEAKERS 1S-103, A, B/TIQ-2													
									ECOM DNG NO. SC-DL-16546													
P	O	5965-355-8895							COVER, LOUDSPEAKER: 80063; SC-D-83313	ea	2	*	*	*	1	14						
P	O	5305-292-8420							THUMBSCREW: 45722; P	ea	4	*	*	*	1							
									GROUP IV													
									LOUDSPEAKER STANDS MT-128, A, B/TIQ-2													
									NOTE: Model column 1 refers to MT-128/TIQ-2; column 2 refers to MT-128A/TIQ-2; column 3 refers to MT-128B/TIQ-2.													
P	O	5965-574-6597		*	*				FOOT, MOUNTING: 80063; SC-B-14074	ea	3	*	*	*	2	13						
P	O	5965-164-7263		*	*				MICROPHONE COVER M-367; 80063; SC-D-5978	ea	1	*	*	*	1							

6009 (Supersedes edition of 1 Dec 64, which is obsolete) AN/TIQ-2, 2A, 2B 3

SEC-FPM 9-646

1990-1991 92-44

(3) SOURCE CD	(1) REC. CODE	(2) REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE										(4) QTY INC IN UNIT		(5) QTY INC IN UNIT		(7) 15 DAY ORG. MAINT. ALW.			(8) ILLUSTRATIONS						
		(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						UNIT OF ISSUE																
											MODEL														
1	2	3	4	5	6																				
P	0	5340-680-3701	AN/TIQ-2, 2A, 2B (continued)																						
			GROUP VI CASE CY-38/TIQ-2 ECOM IMG NO. SC-D-12714																						
			STRIKE, CATCH: 80063; SC-D-20650-27																						
			GROUP VII AMPLIFIER AM-20, A, B/TIQ-2 ECOM IMG NO. SC-DL-22149																						
			NOTE: Model column 1 refers to AM-20/TIQ-2; column 2 refers to AM-20A/TIQ-2; column 3 refers to AM-20B/TIQ-2.																						
			BOOT, DUST AND MOISTURE SEAL: 97539; N1030																						
P	0	5975-755-6151	*	*	*	*	*	*	2	*	*	2	2												
P	0	5975-755-6151	*						4	*	*	2	2												
P	0	5920-351-7264	*	*	*	*	*	*	1	*	*	*	2												
P	0	5920-351-7264	*	*	*	*	*	*	4	*	*	2	2												
P	0	5340-200-8630	*	*	*	*	*	*	2	*	*	2	2												
P	0	5935-223-4243	*	*	*	*	*	*	ea	*	*	2	2				01, 02								
P	0	5960-284-5823	*	*	*	*	*	*	ea	*	*	2	2				V6								
P	0	5960-188-3948	*	*	*	*	*	*	ea	1	2	2	3	6			V6								
P	0	5960-262-0161	*	*	*	*	*	*	ea	1	2	2	3	6	47		V6								
P	0	5960-188-0883	*	*	*	*	*	*	ea	2	2	2	4	8	47		V4, V5								
P	0	5340-498-9162	*	*	*	*	*	*	ea	3	2	5	12	22	47		V1, V2, V3								
P	0	5920-280-4465	*	*	*	*	*	*	ea	4	*	*	2	2											
P	0	5355-160-5964	*	*	*	*	*	*	ea	1	*	2	2	3	46		F1 F2								

AMSEL-111 Form 6009 (Supersedes edition of 1 Dec 64, which is obsolete) AN/TIQ-2, 2A, 2B REC-7M 13-66



REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE										(8) ILLUSTRATIONS	
(2) FEDERAL STOCK NUMBER										(7) 15 DAY ORG. MAINT. ALW.	
(3) DESCRIPTION										(6) QTY INC IN UN PK	
MODEL										(5) QTY INC IN UN PK	
1 2 3 4 5 6										(4) UNIT OF ISSUE	
6240-057-2887										ea	1
9905-252-3748										ea	4
5960-283-5970										ea	3
5960-273-2451										ea	5
AM/TIQ-2, 2A, 2B (continued)										ea	1
LAMP, INCANDESCENT: 80063; SM-D-13452-19										ea	2
MARKER, SELF-ILLUMINOUS: 81390; STRO1										ea	2
RETAINER, ELECTRON TUBE: 80063; SM-B-166142										ea	2
RETAINER, ELECTRON TUBE: 97983; 3T										ea	2
GROUP VIII TURNABLES MX-39, A/TIQ-2										ea	2
NOTE: Model column 1 refers to MX-39/TIQ-2; column 2 refers to MX-39A/TIQ-2.										ea	1
CARTRIDGE, SOUND REPRODUCER: 70638; 4MTB										ea	1
DISK, STROSCOPIC: 96739; 610										ea	1
FUSE, CARTRIDGE: Refer to Group VII for description and forecast.										ea	1
MARKER, SELF-ILLUMINOUS: Refer to Group VII for description and forecast.										ea	1
STYLUS, REPRODUCING: 70638; A-34										ea	1
STYLUS, SOUND REPRODUCING: 70638; M-27-1M										ea	1
TURNABLE, REPRODUCER: 73793; 24432										ea	1

## 800C-WM 3474-00

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																		
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) QTY INC IN UN PK	(5) QTY INC IN UN PK	(6) QTY INC IN UN PK	(7) 30 DAY MAINT. ALW.				(8) PER 100 EQUIP PL	(9) DEPOT MAINT. ALW. PER 100 EQUIP. PL	(10) ILLUSTRATIONS	
		MODEL	CD								DS	(A) 1-20	(B) 21-50	(C) 51-100			(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
1	2		3	4	5	6	(A) 1-20	(B) 21-50	(C) 51-100									
X2	P																	
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EAC-PB 107446

Form 6048 AN/TIQ-2, 2A, 2B

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													(10) ILLUSTRATIONS		
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP. CENTG	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
						DS		GS		I YR. ALW.					
(A)	(B)	(C)	(D)	(E)	(F)	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
						1-20	21-50	51-100	1-20	21-50	51-100				
X2	F	AN/TIC-2, 2A, 2B (continued)	ea												
		HANDLE, LUGGAGE: 57068; 551216	ea	4											
X2	F	HINCE, BUTT: 57068; 838	ea	4											
X2	F	HINCE, BUTT: 57068; 904	ea	2											
X2	F	HINCE, BUTT: 80063; SC-C-22256	ea	3											
X2	F	HOLDER: 80063; SC-B-22246	ea	6											
A	F	HOLDER ASSEMBLY: 80063; SC-C-22244	ea	2											
X2	F	KEEPER, CATCH LUGGAGE: 80063; SC-D-20650-13	ea	1											
X2	F	KEEPER, CATCH LUGGAGE: 80063; SC-D-20650-17	ea	7											
P	O	KEEPER, CATCH LUGGAGE: 80063; SC-B-20650-18	ea	2		*	2	2	*	2	2	13	6		
X2	F	NUT, PLAIN, PLATE: 80063; SC-B-22241	ea	5											
X2	F	NUT, PLAIN, PLATE: 61864; 58020	ea	12											
X2	F	NUT, PLAIN, PLATE: 61864; 58077	ea	143											
X2	F	NUT, PLAIN, PLATE: 61864; 58308	ea	18											
X2	F	NUT, PLAIN, PLATE: 09736; 58808	ea	8											
X2	F	PAD, CUSHIONING: 80063; SC-D-22236-14	ea	2											
X2	F	PIN, COTTER: 80063; SC-B-22251-2	ea	1											
X2	F	PLATE, IDENTIFICATION: 80063; SC-D-22233-1	ea	1											

 6448 AN/TIQ-2, 2A, 2B  
 1 Rev'd



EBC-FM 2474-44

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															(10) ILLUSTRATIONS	
(1) (A)	(2) (B)	(3) (C)	(4) (D)	(5) (E)	(6) (F)	(7) 30 DAY MAINT. ALW.						(8) (G)	(9) (H)	(10) ILLUSTRATIONS		
						DS			GS					(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER	
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL	IND	(A)	(B)	(C)	(D)	(E)	(F)	YR. ALW. PER 100 EQUIP. PL	DEPOT MAINT. PL			100 EQUIP.
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 AMELAR Form 6048 AN/TIQ-2, 2A, 2B  
 1 May 68

EO-PM 3174-6

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE														(10) ILLUSTRATIONS	
(1) (A) SOURCE CD	(2) (B) FEDERAL STOCK NUMBER	(3) (C) DESCRIPTION	(4) (D) UNIT OF ISSUE	(5) (E) QTY INC IN UN PK	(6) (F) QTY INC IN UN	(7) (G) 30 DAY MAINT. ALW.						(8) (H) PER 100 EQUIP. 1 YR. ALW. CNTGTY PL	(9) (I) DEPT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATIONS	
						DS		GS		(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER				
MAINT. CD	CD	MODEL	IND CD	1	2	3	4	5	6			(A)	(B)		
X2 F		AN/TIQ-2, 2A, 2B (continued) SUPPORT, SHIPPING AND STORAGE CONTAINER: 80063; SC-C-22262	ea		2										
X2 F		SUPPORT, SHIPPING AND STORAGE CONTAINER: 80063; SC-B-22275	ea		1										
X2 F		SUPPORT, SHIPPING AND STORAGE CONTAINER: 80063; SC-B-22277	ea		8										
X2 F		TAB: 80063; SC-D-22263	ea		1										
X2 F		WASHER, FLAT: 80063; SC-C-22244-4	ea		4										
X2 F		WASHER, LOCK: 15873; 459793	ea		16										
P O	5965-355-8895	GROUP II LOUDSPEAKERS LS-103, A, B/TIQ-2 ECOM ING NO. SC-DL-16546 COVER, LOUDSPEAKER: 80063; SC-D-83313	ea		2	*	2	*	*	2	10	4	14		
A F	R	DRIVER, LOUDSPEAKER ASSEMBLY: 80063; SC-C-90642	ea		2										
P F	5965-221-5789	DRIVER, LOUDSPEAKER MX-1054/1: 80063; SC-B-90644	ea		2	*	2	*	*	2	13	6			
P F	5965-343-8823	GASKET: 80063; SC-B-90630	ea		2	*	2	*	*	2	10	4			
P F	5965-343-8821	GASKET: 80063; SC-B-90632	ea		2	*	2	*	*	2	10	4			
X2 F		HORN, LOUDSPEAKER: 80063; SC-D-16548	ea		2								14		
P F	5965-161-0040	MOUNT, LOUDSPEAKER: 80063; SC-D-90643	ea		2	*	1	*	*	1	5	2	14		
P F	5940-242-0949	POST, BINDING: 72825; 7308	ea		10	2	2	3	2	2	2	53	16		

 4048 AN/TIQ-2, 2A, 2B  
 4048

 4048  
 4048

AMSEL-44  
1 May 64



REC'D BY 7476-AM

(I)	(J)	(K)	(L)	(M)	(N)	(O)
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	(2) MODEL C D 1 2 3 4 5 6	(3) DESCRIPTION	(4) QTY IN ISSUE
P	O		5965-574-6597	**	AN/TQ-2, 2A, 2B (continued)	
X2	P			*	FOOT, MOUNTING: 80063; SC-B-14074	ea
X2	P			*	HINCE, BUTT: 80063; SC-D-17455-9	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063; SC-C-14067	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063;	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063; SC-D-17455-3	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063;	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063; SC-D-17455-4	ea
X2	P			*	LEG, ELECTRICAL EQUIPMENT: 80063; SC-C-99346	ea
X2	P			**	LEG, ELECTRICAL EQUIPMENT: 80063; SC-C-14068	ea
P	O		5965-164-7263	**	MICROPHONE COVER M-367: 80063; SC-D-5978	ea
X2	P			*	NUT, PLAIN, HEXAGONAL: 80063; SC-D-17455-19	ea
X2	P			*	NUT, PLAIN, HEXAGONAL: 80063; SC-D-17455-20	ea
X2	P			*	NUT, PLAIN, PLATE: 61864; 48402	ea
X2	P			*	NUT, PLAIN, PLATE: 61864; 48448	ea
X2	P			*	NUT, WING: 80063; SC-D-17455-18	ea
X2	P			*	FEZ, LOUDSPEAKER STAND: 80063; SC-D-17455-5	ea
X2	P			*	FIN, COTTER: 80063; SC-D-8021-1	ea

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																								
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) QTY INC IN UN PK	(5) QTY INC IN UN UNIT	(7) 30 DAY MAINT. ALW.					(8) PER 100 EQUIP. ALW. PL CNTGTY	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATIONS							
		MODEL		IND CD						DS		GS					(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER						
(a)	(b)	1	2	3	4	5	6	7	8	(A)	(B)	(C)	(D)	(A)	(B)	(A)	(B)							
MAINT. C	REC. CODE																	(A)	(B)					
																		1-20	21-50	51-100	51-100			





[illegible]

SOURCE CD	V	(a)	(b)	(c)	REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(4)	(5)	(7)						(8)	(9)	(10)					
					(2)	(3)						DESCRIPTION						30 DAY MAINT. ALW.								(A)	(B)			
						MODEL												DS	GS	GS	GS	GS	GS							
					FEDERAL STOCK NUMBER	1	2	3	4	5	6	CD	IND					(a)	(b)	(c)	(d)	(e)	(f)	PER 100 EQUIP. MAINT. PL. ALW. PER 100 EQUIP.	FIGURE NUMBER	ITEM OR SYMBOL NUMBER				
P	P				6145-643-0028										AN/TQ-2, 2A, 2B (continued)			73	146	73	73	29	146	146	885	730				
															CABLE, POWER, ELECTRICAL: 81345; SJ3															
P	P				6145-184-3109										CABLE, SPECIAL PURPOSE, ELECTRICAL: 81349; TS-1H			110	220	110	110	330	220	220	1302	1100				
X2	P														CLAMP, ELECTRICAL: 78533; A3046S															
X2	P														CLAMP, ELECTRICAL: 49367; BHP-4			1												
P	P				5940-204-5777										CLIP, ELECTRICAL: 76545; 21-C			2	*	2	*	2	*	2	13	6				
P	P				5940-230-1195										CLIP, ELECTRICAL: 76545; 21C			2	*	2	*	2	*	2	13	6				
P	P				5935-707-7746										CONNECTOR ASSEMBLY, ELECTRICAL: 80053; SC-B-19385, less items 1 and 7			1	*	*	*	*	*	*	10	4				
P	P				5935-119-4266										CONNECTOR, PLUG, ELECTRICAL: 02660; 75-MCLF			2	*	2	*	2	*	2	13	6	J209, J210			
															OR															
P	P				5935-665-6381										CONNECTOR, PLUG, ELECTRICAL: 71468; XLF3-128C			2	*	2	*	2	*	2	13	6	J209, J210			
P	P				5935-149-3094										CONNECTOR, PLUG, ELECTRICAL: 74945; 7101			2	*	2	*	2	*	2	13	6	J207, J208			
P	P				5935-429-5511										CONNECTOR, PLUG, ELECTRICAL: 74945; 7102			4	*	2	*	2	*	2	27	12	F201 thru F204			
P	P				5935-880-2461										CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7S			2	*	2	*	2	*	2	13	6	J211, J212			
P	P				5935-149-2901										CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-14S-7F			4	*	2	*	2	*	2	27	12	F208 thru F211			
P	P				5935-259-0065										CONNECTOR, PLUG, ELECTRICAL: 81349; AN3106A-20-7S			2	*	2	*	2	*	2	13	6	J201, J202			

ASST. DIR. FPM  
1 May 64

6048 AN/TQ-2, 2A, 2B

REF. PM 74744

800-C-FRM 2474-465

1-800-368-2744

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE						(5) QTY INC IN UN PK		(6) QTY INC IN UN UNIT		(7) 30 DAY MAINT. ALW.					(8) 1 YR ALW PER 100 EQUIP.	(9) 1 YR ALW PER 100 EQUIP.	(10) ILLUSTRATIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			IND	CD	MODEL				IN	IN	UN	PK	IN	IN	UNIT	DS	GS			(A) 1-20	(B) 21-50	(C) 51-100	(A) 1-80	(B) 21-90	(C) 51-100	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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X2	F	SCREW, MACHINE: 80063; SC-D-12715-17																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				



REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) QTY INC IN UNIT		(5) QTY INC IN UNIT	(6) PK	(7) 30 DAY MAINT. ALW. DS	(8) 1 YR. ALW. PER 100 EQUIP. CENTGY PL	(9) DEPT MAINT ALW. PER 100 EQUIP.	(10) ILLUSTRATIONS	
		MODEL						UNIT PK							(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
(A)	(B)	1	2	3	4	5	6	7	8	9	0	(A)	(B)	(A)	(B)	
X2	F															
X2	F															
P	O		*	*	*	*	*			2	*	2	*	2	18	
P	O		*	*	*	*	*			4	*	2	*	2	27	
X2	F															
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88C-FM 3474-46





REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPT MAINTENANCE															(10) ILLUSTRATIONS	
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE						(5) QTY INC IN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.			(8) PER 100 EQUIP. I YR. ALW. DEPT MAINT. 100 EQUIP.	(9) FIGURE NUMBER	(10) ITEM OR SYMBOL NUMBER
			IND	CD	MODEL	1	2	3			4	5	6			
X2 F		AN/TIQ-2, 2A, 2B (continued)														
X2 F		NUT, PLAIN, HEXAGONAL: 80063; SC-C-22152-27	*													
X2 F		NUT, PLAIN, HEXAGONAL: 80063; SC-C-22162-28	*													
X2 F		NUT, PLAIN, HEXAGONAL: 80063; SC-C-22162-31	*													
X2 F		NUT, PLAIN, HEXAGONAL: 81349; 102-3B-4	*													
X2 F		NUT, PLAIN, HEXAGONAL: 81350; 102-3B-6	*													
X2 F		NUT, PLAIN, HEXAGONAL: 81350; 102-3B-8	*													
X2 F		NUT, PLAIN, HEXAGONAL: 81350; 102-4B-10	*													
X2 F		NUT, SELF-LOCKING, CLINCH: 22599; 6805-62	*													
X2 F		PACKING, PREFORMED: 80063; SC-B-96522	*													
X2 F		PANEL, BASE: 80063; SC-C-45976	*													
X2 F		PANEL, BINDING POST: 80063; SC-B-22161	*													
X2 F		PANEL, CONTROL: 80063; SC-D-22155	*													
X2 F		PLATE, MOUNTING, SOCKET, ELECTRON TUBE: 80063; SC-C-22173	*												46	

 1 May 64  
 6048

AN/TIQ-2, 2A, 2B

SEC 798 217-44



EAC-PW 2474-46

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10) ILLUSTRATIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION										(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UN	(7) 30 DAY MAINT. ALW.						(8) 1 YR. ALW. PER 100 EQUIP. PL	(9) DEPOT MAINT. ALW. PER 100 EQUIP. PL	(10) ILLUSTRATIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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ANSEL-48 Form 1 May 64

6048 AN/TIQ-2, 2A, 2B

REC-78 311-648

800-4-A-TRUCKS 2474-46

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																				
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP. PLANT CNGCY	(9) DEPOT MAINT. PER 100 EQUIP.	(10) ILLUSTRATIONS	
		MODEL									DS								(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
(A)	(B)	1	2	3	4	5	6	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)			
X2	F		*					ea		6										
X2	F							ea		4										
X2	F							ea		21										
X2	F	5305-550-9348						ea		5										
X2	F							ea		5										
X2	F	5305-011-4769						ea		61										
X2	F							ea		4										
X2	F							ea		8										
X2	F							ea		3										
P	P	5935-260-0517	*	*				ea		6	2	2	3	2	2	33	18	XVI thru XVI		
X2	F							ea		4										
X2	F							ea		4										
A	F							ea		2										
P	F	5307-550-1001	*	*				ea		3	*	2	2	*	2	27	15			
P	F	5307-550-1010						ea		1	*	*	1	*	*	5	2			
P	F	5930-655-1515	*	*				ea		1	*	2	2	*	2	12	5	45		
P	F	5930-655-1575	*	*				ea		1	*	2	2	*	2	12	5	43		

6448 AN/TIQ-2, 2A, 2B

6448 AN/TIQ-2, 2A, 2B

6448 AN/TIQ-2, 2A, 2B

AMSLAR Form 1 May 64

4448 AN/TTC-2, 2A, 2B

REC-78 317-48

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10) ILLUSTRATIONS																
(A) SOURCE CD	(B) C D	(C) MAINT. C D	(1) REQ. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) QTY INC IN PK	(5) QTY INC IN UN	(6) 30 DAY MAINT. ALW.	(7) DS	(8) 1 YR. ALW. PER 100 EQUIP. PL	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER								
					MODEL	CD	IN	Q	N																	
					1	2	3	4	5	6																
P	F			5930-559-1582	*	*					ea	2	*	2	2	10	43	S2, S4								
P	F			5930-559-1582	*	*					ea	3	*	2	2	15	43	S1, S2, S4								
X2	F				*	*					ea	1														
X2	F			5940-306-2232	*	*					ea	1														
X2	F				*	*					ea	1														
X2	F			5940-231-6876	*	*					ea	1														
X2	F				*	*					ea	1														
X2	F				*	*					ea	1														
X2	F				*	*					ea	6														
X2	F				*	*					ea	3														
X2	F				*	*					ea	2														
X2	F				*	*					ea	2														
P	F			5950-250-1754	*	*					ea	1	*	2	2	12	5	T1								
P	F				*	*					ea	4	*	2	2	27	12	T3 thru T6								
P	F			5950-244-5934	*	*					ea	1	*	2	2	12	5	T2								
P	F			5950-550-7493	*	*					ea	1	*	2	2	12	5									
X2	F				*	*					ea	8														
X2	F				*	*					ea	1														
X2	F				*	*					ea	1														
X2	F				*	*					ea	2														

 1 May 64  
 AN/TTQ-2, 2A, 2B

6048

AN/TTQ-2, 2A, 2B

SEC-FM 317-48





AMSEL-HR Form	6048	AN/TTQ-2, 2A, 2B
1 May 66		

EBC-FM 2474-66

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10)											
SOURCE CD	MAINT. CD	REQ. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) QTY INC IN UN PK	(5) QTY INC IN UN UNIT	(7) 30 DAY MAINT. ALW.						(8) 1 YR. ALW. PER 100 EQUIP PL	(9) DEPOT ALY PL	(10) ILLUSTRATIONS	
				(3) DESCRIPTION								DS			GS					(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
				MODEL	CD	CD	CD	CD	CD			(A)	(B)	(C)	(A)	(B)	(C)				
				1	2	3	4	5	6			(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)		
P	O		6625-224-5133	*	*						ea	1	*	*	1	*	1	30			
X<	P			*							ea	1									
X2	P			*							ea	1									
A	P	R		*							ea	1									
A	P	R		*							ea	1									
			5920-280-4465	*	*						ea	1						42	F101		
			5920-284-9201	*	*						ea	1						51	XF101		
P	P		5835-406-3318	*	*						ea	1	*	*	1	*	1	2	51		
X2	P			*	*						ea	2									
X2	P			*	*						ea	1									
A	P	R		*	*						ea	1						50	0101		
X2	P			*	*						ea	4									
P	P		5935-283-1259	*	*						ea	1	*	*	2	*	2	42	J101		
			9905-252-3748	*	*						ea	1									

4648 AN/TIQ-2, 2A, 2B

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE

4648 AN/TIQ-2, 2A, 2B

AN/TIQ-2, 2A, 2B

6048

AN/TIQ-2, 2A, 2B

84C-706 1774-6

800-4-A-FLIGHT 2474-44

800-368-2744



[illegible]

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													(10) ILLUSTRATIONS		
(1) SOURCE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP ALW. PER CENTGY	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(11) FIGURE NUMBER	(12) ITEM OR SYMBOL NUMBER	
					DS		GS		DS						GS
					(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)
		AN/TIQ-2, 2A, 2B (continued)	ea	1											
X2	5940-133-0721	TERMINAL BOARD: 71785; 1542	ea	1	*	*	2	*	*	2		3	4		T101
P	5950-234-0704	TRANSFORMER, POWER, FIXED; AUTOTRANSFORMER: 80063; SC-B-22227	ea	1	*	*	1	*	*	1		4	1	2	
P	5835-251-9138	TURNTABLE, REPRODUCER: 73793; 24432	ea	3											
X2		WASHER, FLAT: 80063; SC-B-22202-13	ea	17											
X2		WASHER, FLAT: 80063; SC-B-22202-16	ea	19											
X2		WASHER, LOCK: 78189; 1904	ea	4											
X2	6625-981-3016	WASHER, LOCK: 11332; 1906	ea	36											
X2	6625-981-3016	WASHER, LOCK: 78189; 1908	ea	41											
X2		WASHER, LOCK: 11332; 1910	ea	8											
X2		WASHER, NONMETALLIC: 80063; SC-B-22216	ea	4											
X2			ea	1											

6048 AN/TIQ-2, 2A, 2B

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4130-262-7126	48	A5	5910-543-9264	48	C1, C9 thru C12
4140-269-8540	47	B1	5910-666-7753	48	C20, C21
5835-243-0594	42	O101	5910-667-5216	42	C101
5835-243-0595	42	O102	5910-667-5412	48	C6
5835-543-0972	42	E101 O101	5910-840-6672	48	C7
5905-100-3239	48	R21	5920-280-4465	46 42	F1, F2 F101
5905-190-8865	48	R3, R17	5920-284-9201	51	XF101
5905-190-8889	48	R23	5930-050-2627	42	S103
5905-192-0667	48	R10	5930-615-9376	42	S101
5905-195-6741	48	R2, R15	5930-655-1513	42	S102
5905-195-6761	48	R11, R28 thru R31	5930-655-1515	46	S1
5905-195-6806	48	R19	5930-655-1575	43	S3
5905-226-9441	46	R4, R5, R25, R26	5930-655-1582	43	S1, S2, S4
5905-249-3661	48	R7	5935-192-4729	46	J4
5905-249-5554	46	R9	5935-230-1561	46	J7
5905-254-9201	48	R1, R6, R8, R14, R16	5935-259-3874	46	F1, P2
5905-279-1751	48	R12	5935-280-1874	46 42	F3 F101
5905-279-1876	48	R18	5935-283-1259	46	J3, J5, J6
5905-279-2516	42	R101	5935-283-1269	42	J101
5905-279-2628	48	R24	5935-755-3688	46	J1, J2
5905-279-2643	48	R33	5940-242-0949	46	E1, E2
5905-279-5359	48	R32	5950-195-9818	47	L1
5905-283-4739	48	R13	5950-195-9822	47	L3
5905-299-2037	48	R22	5950-234-0704	42	T101
5905-542-8830	48	R20, R34	5950-244-5934	47	T3 thru T6
5910-112-7595	48	C5	5950-250-1754	47	T1
5910-112-7619	48	C2, C3, C4, C8, C15	5950-250-7493	47	T2
5910-120-1687	62	C13, C14, C16 thru C19	5950-518-0091	47	L2
	63	C13, C14, C16, C17, C18	5960-188-3948	47	V6
	64	C13, C14, C16, C17, C18, C23	5960-262-0161	47	V4, V5

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6105-498-4975	42	B101			
6210-186-7930	46	I1			
6240-057-2887	46	E3			

6069

AN/TIQ-2, 2A, 2B

ESC-FM 473

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,  
*General, United States Army,*  
*Chief of Staff.*

Official:

KENNETH G. WICKHAM,  
*Major General, United States Army,*  
*The Adjutant General.*

Distribution:

*Active Army:*

USASA (2)	USAESC (70)
CNGB (1)	USARJ (5)
OCC-E (7)	USARHAW (5)
Dir/Trans (1)	USARYIS (5)
CofEngrs (1)	MDW (1)
TSG (1)	Armies (2) except
CofSptS (1)	Second (5)
USAAENBD (2)	Fourth (5)
USAAESWBD (5)	Eighth (5)
USARADB (5)	Corps (2)
USAIB (5)	USAC (3)
USACDCEA (1)	1st GM Bde (5)
USACDCCBRA (1)	507th USASA Gp (5)
USACDCCEA (1)	508th USASA Gp (5)
USACDCCEA Ft Huachuca	318th USASA Bn (5)
(1)	319th USASA Bn (5)
USACDCOA (1)	Svc Colleges (2)
USACDCQMA (1)	USASCS (5)
USACDCTA (1)	USASESCS (5)
USACDCADA (1)	USAADS (5)
USACDCARMA (1)	USAAMS (5)
USACDCAVNA (1)	USAARMS (5)
USACDCARTYA (1)	USAIS (5)
USACDCSWA (1)	USAES (2)
USAMC (5)	USAWC (5)
USCONARC (5)	USAAVNS (5)
ARADCOM (5)	USAVETS (5)
ARADCOM Rgn (2)	USAOCS (5)
OS Maj Comd (4)	USAQMS (5)
LOGCOMD (2)	USAMPS (5)
USAMICOM (4)	USATSCH (5)
USASTRATCOM (4)	USACSS (5)
USASTRATCOM EUR (5)	Frankford Arsenal (5)
USAWECOM (5)	Picatinny Arsenal (5)
USAAVCOM (5)	Edgewood Arsenal (5)



Redstone Arsenal (5)	ARMISH (5)
Watertown Arsenal (5)	DPG (5)
USATC Armor (2)	LGH (5)
USATC Engr (2)	VFGH (5)
USATC Inf (2)	FGH (5)
USASTC (2)	BGH (5)
WRAMC (1)	AAF, CONUS (5)
Army Pic Cen (2)	USARSG (5)
USACDCEC (10)	APG (5)
USAMEDTC (5)	USASETAF (5)
USA Off Eval Cen (5)	AH (USAREUR) (5)
USAJFKCENSPWAR (5)	AH (USARPAC) (5)
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*NG*: State AG (3), units—same as active Army except allowance is one  
(1) copy per unit.

*USAR*: None.

For explanation of abbreviations used, see AR 320-50.





**A** Position of operator and victim



**B** Compression phase



**C** Expansion phase (arm lift)



**D** Expansion phase (arm release)

## ARTIFICIAL RESPIRATION

### GENERAL PRINCIPLES

1. Seconds count! Begin at once! Don't take time to move the victim unless you must. Don't loosen clothes, apply stimulants or try to warm the victim. Start resuscitation! Get air in the lungs! You may save a life!
2. Place the victim's body in a prone position, so that any fluids will drain from the respiratory passages. The head should be extended and turned sideward *never flexed forward*; the chin shouldn't sag, since obstruction of the respiratory passages may occur.
3. Remove any froth or debris from the mouth with your fingers. Draw the victim's tongue forward.
4. Begin artificial respiration. Continue it rhythmically and without any interruption until natural breathing starts or the victim is pronounced dead. Try to keep the rhythm smooth. Split-second timing is not absolutely essential.
5. When the victim starts breathing, or when additional help is available loosen the clothing; remove it, if it's wet; keep the victim warm. Shock should receive adequate attention. Don't interrupt the rhythmical artificial technique for these measures. Do them only when you have help or when natural breathing has started.
6. When the victim is breathing, adjust your timing to assist him. Don't fight his efforts to breathe. Synchronize your efforts with his. After resuscitation, keep him lying down until seen by a physician or until recovery seems certain.
7. Don't wait for mechanical resuscitation! If an approved model is available, use it, but, since mechanical resuscitators are only slightly more effective than properly performed "push-pull" manual technique, *never* delay manual resuscitation for it.

### BACK-PRESSURE ARM LIFT METHOD

1. *Position of Victim.* Place the victim in the prone (face-down) position. Bend his elbows; place one hand upon the other. Turn his face to one side, placing his cheek upon his hands.
2. *Position of Operator.* Kneel on your left or right knee, at the victim's head, facing him. Your knee should be at the side of the victim's head close to his forearm, your foot should be near his elbow. Kneel on both knees if you find it more comfortable, with one knee on each side of the head. Place your hands on the flat of the victim's back so that their heels are just below the lower tip of his shoulder blades. With the tip of your thumbs touching spread your fingers downward and outward. (See A).
3. *Compression Phase.* Rock forward until your arms are approximately vertical and allow the weight of the upper part of your body to exert a slow, steady, even, downward pressure upon your hands. This forces air out of the lungs. Keep your elbows straight and press almost directly downward on the back. (See B).
4. *Expansion Phase.* Release the pressure, avoid any finish thrust, and commence to rock backward slowly. Place your arms upon the victim's arms just above the elbows, and draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the victim's shoulders. Don't bend your elbows. As you rock backward, the victim's arms will be drawn toward you. (The arm lift expands the chest by pulling on the chest muscles, arching the back and relieving the weight on the chest.) Drop the arms gently to the ground or floor. This completes the cycle. (See C and D). Now, repeat the cycle.
5. *Cycle Timing and Rhythm.* Repeat the cycle 10 to 12 times per minute. Use a steady uniform rate of Press, Release, Lift, Release. Longer counts of about equal length should be given to the "Press" and "Lift" steps of the compression and expansion phases. Make the "Release" periods of minimum duration.
6. *Changing Position or Operator.*
  - (a) Remember that you can use either or both knees or can shift knees during the procedure, provided you don't break the rhythm. Observe how you rock forward with the back-pressure and backward with the arm-lift. The rocking motion helps to sustain the rhythm and adds to the ease of operation.
  - (b) If you tire and another person is available, you can "take turns." Be careful not to break the rhythm in changing. Move to one side and let your replacement come in from the other side. Your replacement begins the "Press-Release" after one of the "Lift-Release" phases, as you move away.





TECHNICAL MANUAL  
No. 11-2586  
TECHNICAL ORDER  
No. 31S1-2TIQ2-1

DEPARTMENTS OF THE ARMY  
AND THE AIR FORCE  
WASHINGTON 25, D. C., 29 November 1955

## PUBLIC ADDRESS SETS AN/TIQ-2, AN/TIQ-2A, AND AN/TIQ-2B.

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\*This manual supersedes TM 11-2586, 15 April 1947, including C 1, 6 August 1948; C 2, 18 April 1949 and C 3, 28 November 1952.

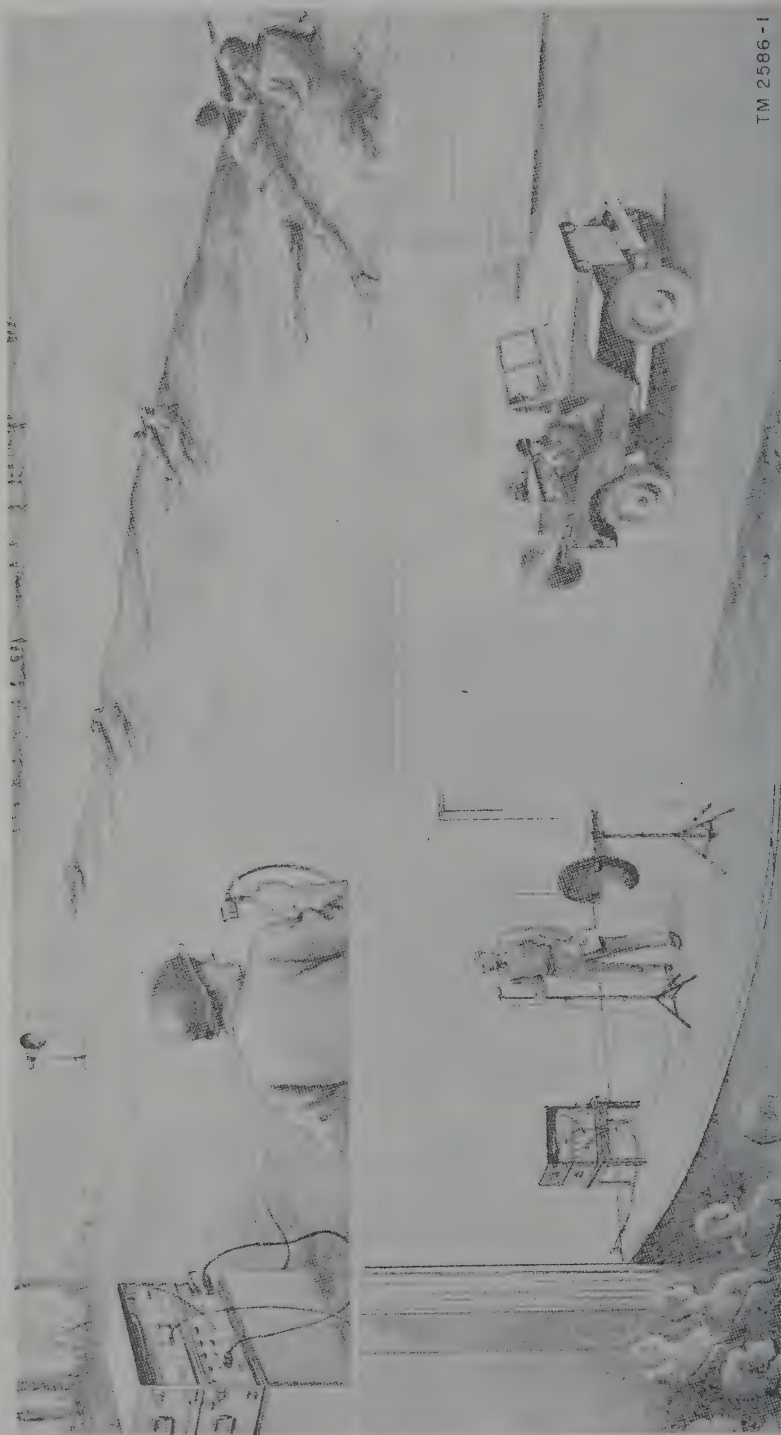


Figure 1. Operation of Public Address Set AN/TIQ-2(\*).

# CHAPTER 1

## INTRODUCTION

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### Section I. GENERAL

#### 1. Scope

*a.* This manual contains complete instructions for the installation, operation, maintenance, and repair of Public Address Set AN/TIQ-2(\*).

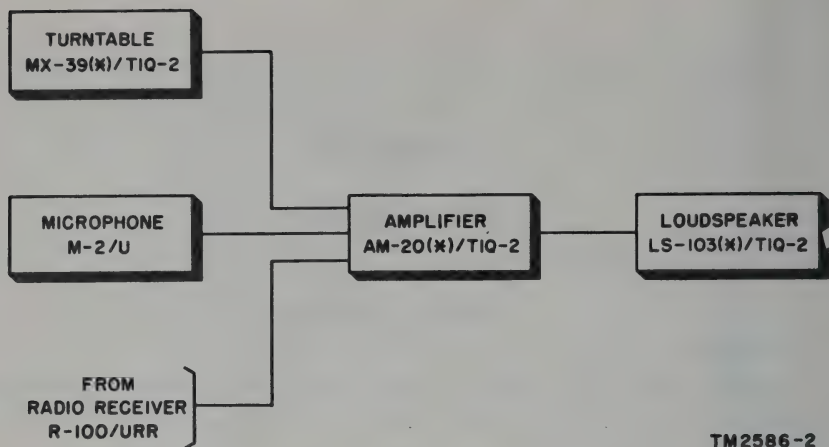
*b.* Basic nomenclature followed by (\*) is used to cover all models of an item of equipment included in this manual: For example, Public Address Set AN/TIQ-2(\*) refers to Public Address Sets AN/TIQ-2, AN/TIQ-2A, and AN/TIQ-2B. Amplifier AM-20(\*)/TIQ-2 refers to Amplifiers AM-20/TIQ-2, AM-20A/TIQ-2, AM-20B/TIQ-2, and AM-20B/TIQ-2 (modified). Turntable MX-39(\*)/TIQ-2, refers to Turntables MX-39/TIQ-2 and MX-39A/TIQ-2. Headset HS-30-(\*) refers to HS-30, HS-30-A, -B, -C, -D, -E, -F, -G, -H, -J, -K, -L, -M, -N, -O, -R, and -U. Loudspeaker LS-103(\*)/TIQ-2 refers to Loudspeakers LS-103/TIQ-2 and LS-103A/TIQ-2. Case CY-37(\*)/TIQ-2 refers to Case CY-37/TIQ-2 and CY-37A/TIQ-2. Loudspeaker Stand MT-128(\*)/TIQ-2 refers to Loudspeakers Stands MT-128/TIQ-2 and MT-128A/TIQ-2. Microphone Stand MT-596(\*)/U refers to Microphone Stands MT-596/U, MT-596A/U, and MT-596B/U. Vibrator Pack PP-31(\*)/TIQ-2 refers to Vibrator Packs PP-31/TIQ-2, PP-31A/TIQ-2, and PP-31B/TIQ-2. Rotary Converter PU-143(\*)/U refers to Rotary Converter PU-143/U, PU-143A/U, and PU-143B/U. Power Unit PE-214-(\*) refers to Power Units PE-214, PE-214-A, PE-214-B, PE-214-C and PE-214-D.

*c.* Comments on this manual should be forwarded direct to the Commanding Officer, Signal Corps Publications Agency, Fort Monmouth, N. J., ATTN: Standards Division.

#### 2. Forms and Records

Use the following forms for reporting unsatisfactory conditions of Army equipment and materiel, and when performing preventive maintenance.

*a.* DD Form 6 (Report of Damaged or Improper Shipment) will be filled out and forwarded as prescribed in SR 745-45-5 (Army);



TM2586-2

Figure 2. PA set, functional block diagram.

Navy Shipping Guide, Article 1850-4 (Navy); and AFR 71-4 (Air Force).

b. DA Form 468 (Unsatisfactory Equipment Report) will be filled out and forwarded to the office of the Chief Signal Officer as prescribed in 700-45-5.

c. DD Form 535 (Unsatisfactory Report) will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700-45-5 and AF TO 00-35D-54.

d. DA Form 11-250 (Operator First Echelon Maintenance Check List for Signal Corps Equipment (Public Address, Recorder, Reproducer)) (fig. 25) will be prepared in accordance with the instructions on the back of the form.

e. DA Form 11-251 (Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Public Address, Recorder, Reproducer)) (fig. 26) will be prepared in accordance with the instructions on the back of the form.

f. Use other forms and records as authorized.

## Section II. DESCRIPTION AND DATA

### 3. Purpose and Use

a. *Purpose.* Public Address Set AN/TIQ-2(\*) is a portable loudspeaker system which permits an individual to speak to large groups of troops or to troops dispersed over a wide area (fig. 1). It also provides facilities for retransmitting radio programs and recordings. The public address (PA) set can be operated on either alternating current (ac) or direct current (dc).



*b. Use.* Public Address Set AN/TIQ-2(\*) can be used inside a building or assembly hall, outdoors in training areas, or mounted in a vehicle for mobile transmission. Figure 2 is a block diagram of the equipment ready for use.

#### 4. Technical Characteristics

##### *a. Amplifier AM-20(\*)/TIQ-2.*

Input voltage-----	115 or 230 volts at 60 cycles.
Power required-----	150 watts.
Power output-----	20 watts at less than 5 percent distortion (depending upon the position of the tone control).
Frequency range-----	From 50 to 10,000 cycles with maximum variation of 3 decibels (depending upon the position of the tone control).
Input channels-----	8 as follows: Two high-impedance microphone input circuits, two low-impedance microphone input circuits, carbon microphone input (100 ohms), radio input (high impedance), line (100 ohms) and phonograph input circuit (100 ohms). On Amplifier AM-20B/TIQ-2, there is an additional high-impedance phonograph input.
DB gain-----	Two channels have a 104 db gain, these are the HI-IMP-MIC-1 and LOW-IMP-MIC-1 and the HI-IMP-MIC-2 and LOW-IMP-MIC-2. One channel, the PHONO OR LINE, has a 75 db gain. One channel, RADIO-C. MIC., has a 60 db gain.
Number of tubes-----	6 (3 are duo-triode).
Output circuit-----	Varitapped output transformer with 30-, 60-, 125- and 250-ohm taps for speaker matching. There is also a 600-ohm tap on the AM-20A/TIQ-2, AM-20B/TIQ-2, and AM-20B/TIQ-2 (modified).
Auxiliary power-----	6- to 12-volts dc source using Vibrator Power Pack PP-31/TIQ-2.
Booster circuit-----	An additional Amplifier AM-20(*)/TIQ-2.

*b. Turntable MX-39(\*)/TIQ-2.*

Input voltage-----	115 or 230 volts at 60 cycles.
Power required-----	Approximately 25 watts.
Phonograph motor:	
Type-----	Single-phase, shaded-pole, induction.
Speeds-----	33 $\frac{1}{3}$ and 78 rpm.
Speed control-----	Governor; controlled by a lever on top of the turntable. Adjustable within 10 percent.
Power required-----	Approximately 25 watts.
Mechanical feature-----	Interchangeable gears.
Reproducer head-----	Astatic type needle, crystal pickup. Dual needle, turnover, piezoelectric, ceramic cart-ridge, standard and microgroove operation.

*c. Loudspeaker LS-103(\*)/TIQ-2.*

Power rating-----	20 watts.
Type-----	Re-entrant.
Input-----	Impedance matching transformer with a 0-, 250-, 500-, 1,000-, and 2,500-ohm impedance winding.

*d. Microphone M-2/U.*

Type-----	Dynamic, moving-coil type, uni-directional.
Frequency range-----	60 to 7,500 cycles.
Output-----	-56 db (relative to 1 volt-per-dyne per square centimeter sound pressure).
Swivel joint-----	Permits full 180° travel of microphone (horizontal to vertical to horizontal).

## 5. Common Names Used for Equipment Nomenclature

Nomenclature and the common names used in their places in this manual are listed below.

<i>Nomenclature</i>	<i>Common name</i>
Public Address Set AN/TIQ-2(*)-----	PA set.
Amplifier AM-20(*)/TIQ-2-----	Amplifier.
Loudspeaker LS-103(*)/TIQ-2-----	Speaker.
Turntable MX-39(*)/TIQ-2-----	Turntable.
Cable Assemblies:	
Cord CX-49/TIQ-2-----	Power cord.
Cord CX-53/TIQ-2-----	Power extension cord (W203).
Cord CX-54/TIQ-2-----	Power extension cord (W204).
Cord CX-55/TIQ-2-----	Power adapter cord.
Cord CX-51/TIQ-2-----	Turntable pickup cord.
Cord CX-50/TIQ-2-----	Microphone cord.
Cord CX-56/TIQ-2 or Special Purpose Electrical Cable Assembly CX-1833/U (25 ft).	Microphone extension cord.
Case CY-38/TIQ-2 (for amplifier)-----	Amplifier case.

<i>Nomenclature</i>	<i>Common name</i>
Case CY-38/TIQ-2 (for turntable)-----	Turntable case.
Case CY-38/TIQ-2 (for spare parts)-----	Spare parts case.
Case CY-37(*)/TIQ-2-----	Speaker case.
Microphone M-2/U-----	Microphone.
Loudspeaker Stand MT-128(*)/TIQ-2-----	Speaker stand.
Microphone Stand MT-596(*)/U-----	Microphone stand.

## 6. Packaging Data

*a. Public Address Set AN/TIQ-2.* The following charts describe the size, weight, volume, and contents of the AN/TIQ-2 when it is packed for export shipment.

*Note.* Items may be packed in a manner different from that listed depending upon the supply channel.

### (1) Size, weight, and volume.

Case No.	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Unit weight (lb)
1 of 3-----	28	46	38	28	250
2 of 3-----	12	20	54	7	85
3 of 3-----	31	50	29	20	250

Total weight (lb)----- 585

### (2) Contents.

Case No.	Contents	Notes
1 of 3-----	3 Cases CY-38/TIQ-2 consisting of: 1 amplifier case. 1 turntable case. 1 spare parts case.	The spare parts case contains the spares and 2 microphones. For a list of the spare parts, refer to paragraph 9.
2 of 3-----	2 Loudspeaker Stands MT-128 (*)/TIQ-2.	
3 of 3-----	1 Case CY-37/TIQ-2 (speaker case).	This case contains 2 microphone stands, 2 speakers, and 11 cables.

*b. Public Address Sets AN/TIQ-2A and AN/TIQ-2B.* The following charts list the size, weight, volume, and contents of the AN/TIQ-2A and AN/TIQ-2B when they are packed for export shipment.

*Note.* Items may be packed in a manner different from that listed depending upon the supply channel.

(1) *Size, weight, and volume.*

Case No.	Height (in.)	Width (in.)	Depth (in.)	Volume (cu. ft.)	Unit weight (lb)
1 of 2-----	48	41	50	55	350
2 of 2-----	12	20	54	7	85

Total weight (lb)----- 435

(2) *Contents.*

Case No.	Contents	Notes
1 of 2-----	1 Case CY-37A/TIQ-2 (speaker case).	Case CY-37A/TIQ-2 contains the record albums, 2 microphones, 2 microphone stands, 2 speakers, 11 cables, and the spare parts. The spare parts are listed in paragraph 9.
	2 Cases CY-38/TIQ-2 consisting of: 1 amplifier case. 1 turntable case.	
2 of 2-----	2 Loudspeaker Stands MT-128(A)/TIQ-2.	

## 7. Table of Components

(figs. 3 and 4)

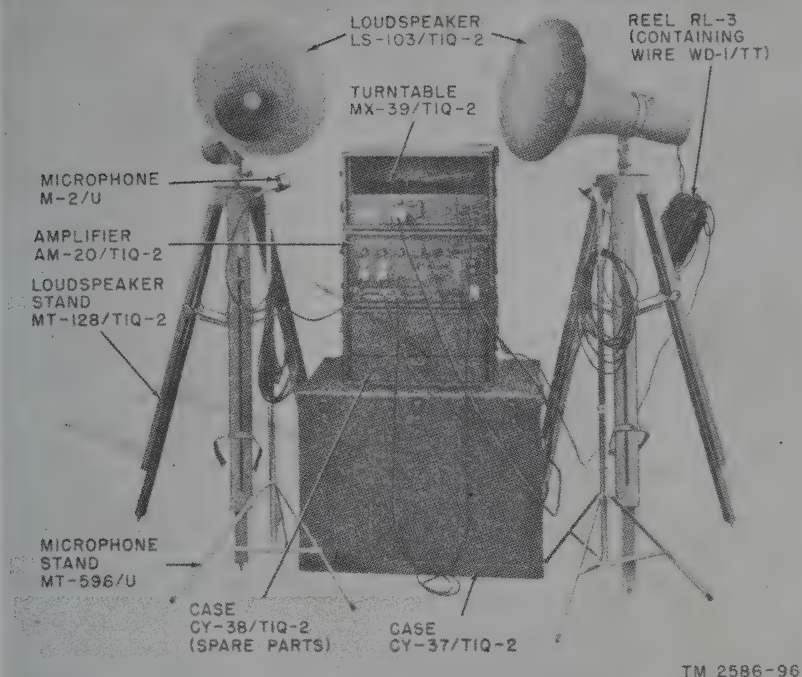
*a. Components of AN/TIQ-2.*

Component	Required Number	Length (in.)	Width (in.)	Height (in.)	Volume (cu ft)	Weight (lb)
Amplifier AM-20/TIQ-2	1	19	14	8¾	1.4	65
Turntable MX-39/TIQ-2	1	19	14	6	1.0	37
Case CY-38/TIQ-2 (for spare parts, amplifier, and turntable)	3	21	16	10	1.9	10
Case CY-37/TIQ-2	1	33¾	22	23	9.1	78
Loudspeaker LS-103/TIQ-2	2	25	19 dia	---	---	22.0 ea
Loudspeaker Stand MT-128/TIQ-2	2	48	6 dia	---	2	18.5 ea
Microphone M-2/U	2	---	---	---	---	.875 ea
Microphone Stand MT-596/U	2	---	---	---	---	4.0
Headset HS-30-U	1	---	---	---	---	.8
Reel RL-3	2	---	---	---	---	3.6
Cord CX-49/TIQ-2	2	10 ft	---	---	---	1.125
Cord CX-50/TIQ-2	2	25 ft	---	---	---	1.0 ea
Cord CX-51/TIQ-2	2	10 ft	---	---	---	.375
Cord CX-53/TIQ-2	1	25 ft	---	---	---	4.375
Cord CX-54/TIQ-2	1	25 ft	---	---	---	2.375
Cord CX-55/TIQ-2	1	3 ft	---	---	---	.625
Cord CX-56/TIQ-2	2	25 ft	---	---	---	.875
Cord CD-605 (6 ft 6 in.)	1	6.5 ft	---	---	---	.5
Running spares (par. 9)	1 set	---	---	---	---	---
Record albums	3	---	---	---	---	.5



b. Components of AN/TIQ-2A or AN/TIQ-2B.

Component	Required number	Length (in.)	Width (in.)	Height (in.)	Volume (cu ft)	Weight (lb)
✓ Amplifier AM-20A/TIQ-2 or AM-20B/TIQ-2 (Modified)	1	19	14	8 3/4	1.4	65
✓ Turntable MX-39A/TIQ-2	1	19	14	6	1.0	37
✓ Case CY-38/TIQ-2	2	21	16	10	1.9	10
✓ Case CY-37A/TIQ-2	1	34	22	23	9.5	80
✓ Loudspeaker LS-103A/TIQ-2 or LS-103B/TIQ-2	2	25	19 dia			22.0
✓ Loudspeaker Stand MT-128A/TIQ-2	2	48	6 dia		2	18.5
✓ Microphone M-2/U	2					.875
✓ Microphone Stand MT-596A/U	2	26 1/4 to 78				.40
✓ Headset HS-30-U	1					.8
✓ Reel RL-3	2					3.6
✓ Cord CX-49/TIQ-2	2	10 ft				1.125
✓ Cord CX-50/TIQ-2	2	25 ft				1.0
✓ Cord CX-51/TIQ-2	2	10 ft				.375
✓ Cord CX-53/TIQ-2	1	25 ft				4.375
✓ Cord CX-54/TIQ-2	1	25 ft				2.375
✓ Cord CX-55/TIQ-2	1	3 ft				.625
✓ Cord CX-56/TIQ-2 or Special Purpose Electrical Cable Assembly						
✓ CX-1833/U (25 ft)	2	25 ft				.875
✓ Cord CD-605 (6 ft 6 in.)	1	6.5 ft				.5
Running spares (par. 9)						
Record albums	3					.5



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**Figure 3. Public Address Set AN/TIQ-20.**

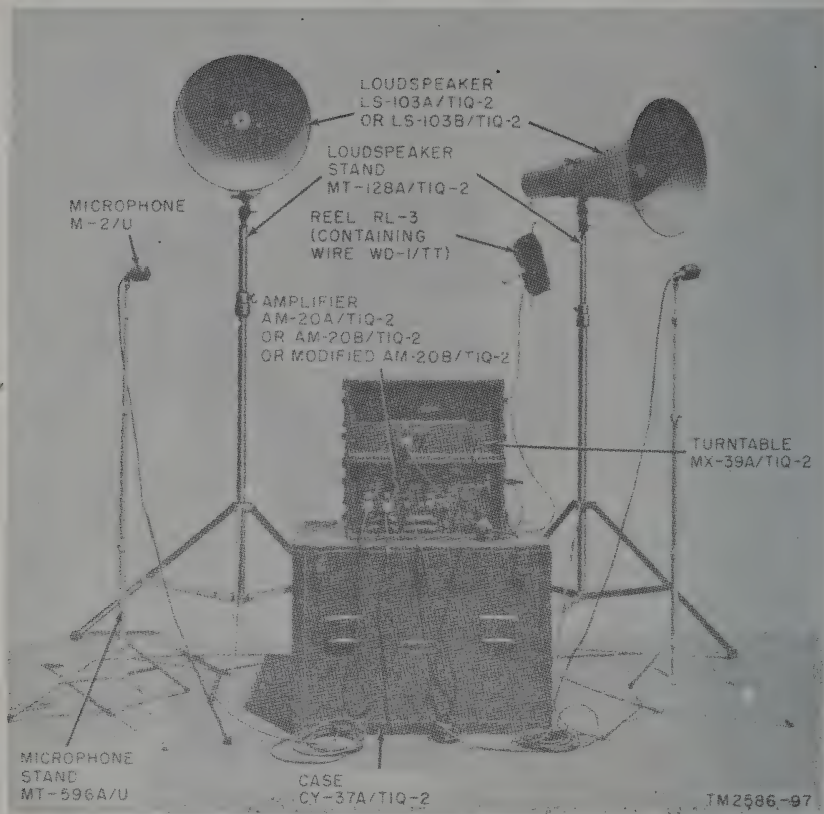
## 8. Description of Public Address Set AN/TIQ-2(\*)

Public Address Set AN/TIQ-2(\*) includes an amplifier, a turntable, two speakers, and two microphones. There are stands for the microphones and speakers. There are 11 interconnecting cables, 3 record albums, and a headset.

*a. Amplifier AM-20(\*)/TIQ-20.* The amplifier (fig. 5) is enclosed in a reinforced plywood case with two handles and a cover which, when removed, gives access to the control panel. The control panel (fig. 5) contains all the controls, switches, and power input and output connectors.

*b. Turntable MX-39(\*)/TIQ-20.* The turntable (fig. 5) is enclosed in a reinforced plywood case with handles and a cover which, when removed, gives access to the control panel and the turntable. The control panel (fig. 5) contains switches and power input and output connectors. Above the control panel is the turntable platen and the pickup arm. The pickup arm contains two phonograph needles.

*c. Loudspeaker LS-103(\*)/TIQ-2.* The speakers (fig. 6) are enclosed in the speaker case (fig. 11). Each speaker consists of a speaker



**Figure 4. Public Address Set AN/TIQ-2A or AN/TIQ-2B.**

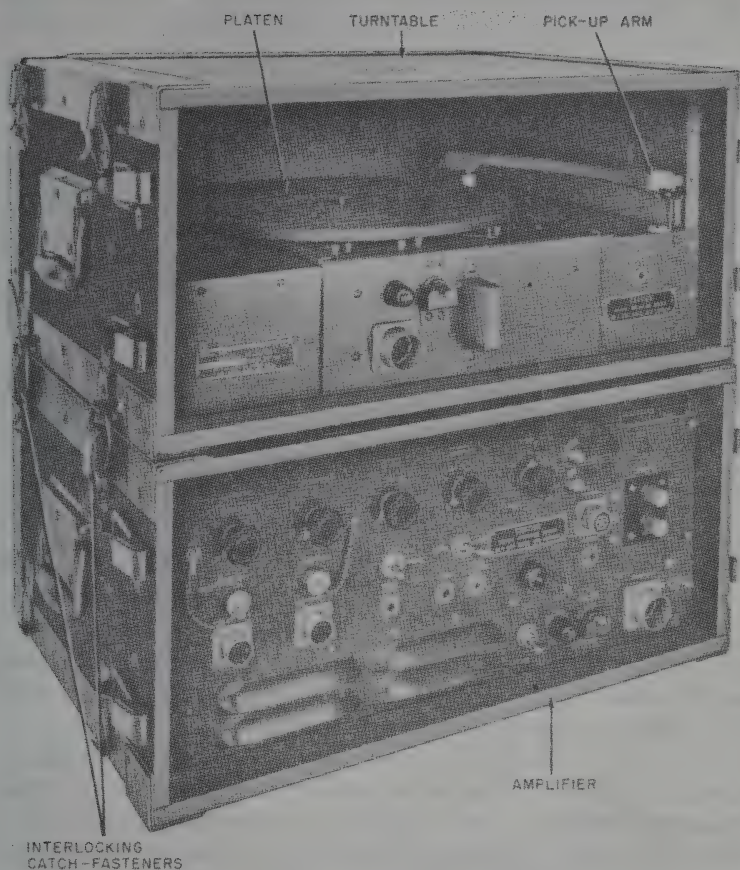
horn and a mounting unit. The speaker horn is bell-shaped. It connects to the mounting unit by four catch-fasteners.

*d. Cords.* The 11 rubber-covered cords are stored in the speaker case (fig. 11). There are five power cords, two microphone cords, and two microphone extension cords, one turntable pickup cord, and one headset extension cord. Each cord has a bend which is stamped with a number as shown in figures 7, 8, and 9. Power extension cord (W203) is terminated at one end in a four-receptacle junction box.

*e. Loudspeaker Stands MT-128/TIQ-2 and MT-128A/TIQ-2.*

- (1) The MT-128/TIQ-2 (fig. 3) is a wooden speaker stand. The speaker stand has three legs which are hinged at the top. Each leg has an extension for raising the speaker. A mounting stud is provided in the center of the top for mounting the speaker on the stand.
- (2) The MT-128/TIQ-2 (fig. 4) is a metal speaker stand. The speaker stand has three legs which fold into the center shaft. The center shaft can be extended to raise the speaker. A





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Figure 5. Turntable MX-39/TIQ2, mounted on Amplifier AM-20/TIQ-2.

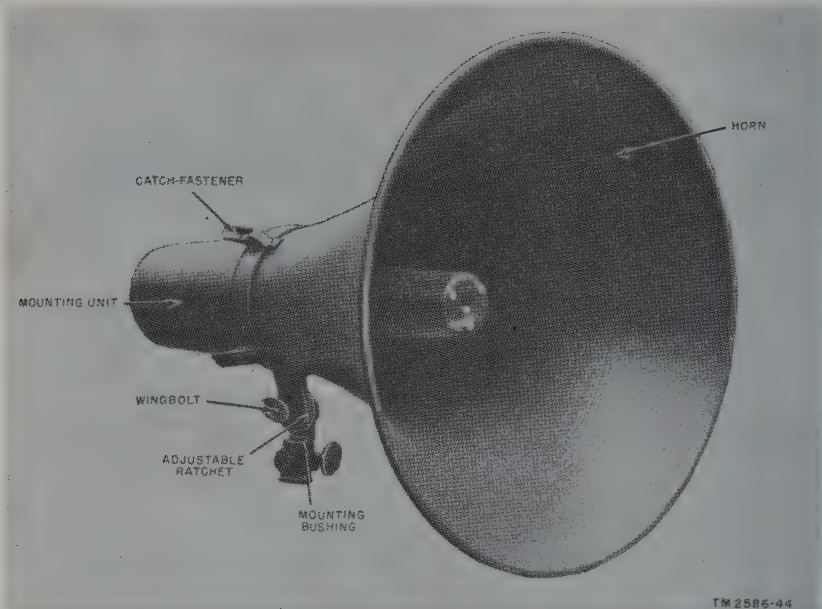
mounting stud is provided at the top of the center shaft for mounting the speaker on the stand.

*f. Microphone M-2/U.* Two microphones are stored in the speaker case (fig. 11). They are aluminum-finished and may be painted olive drab. Each microphone can be mounted on a stand (fig. 10) and has a receptacle for the microphone cord.

*g. Microphone Stand MT-596(\*)/U.* Two microphone stands are stored in the speaker case. Each microphone stand has four extensions and three legs which can be folded for storage.

*h. Reel RL-3.* Two Reels RL-3 are included with the PA set. These reels can each hold 200 feet of two-conductor Wire WD-1/TT or equal.

*i. Headset HS-30-(\*).* One Headset HS-30-(\* ) (fig. 9) is packed in the speaker case.



**Figure 6. Loudspeaker LS-103(\*)/TIQ-2.**

*j. Case CY-38/TIQ-2.* The amplifier, spare parts, and the turntable are contained in their own cases. On the AN/TIQ-2A and AN/TIQ-2B, the spare parts case is not provided.

*k. Case CY-37(\*)/TIQ-2.* The speaker case (fig. 11) contains the speakers, microphones, microphone stands, record albums, and the interconnecting cables. It may also contain the spare parts.

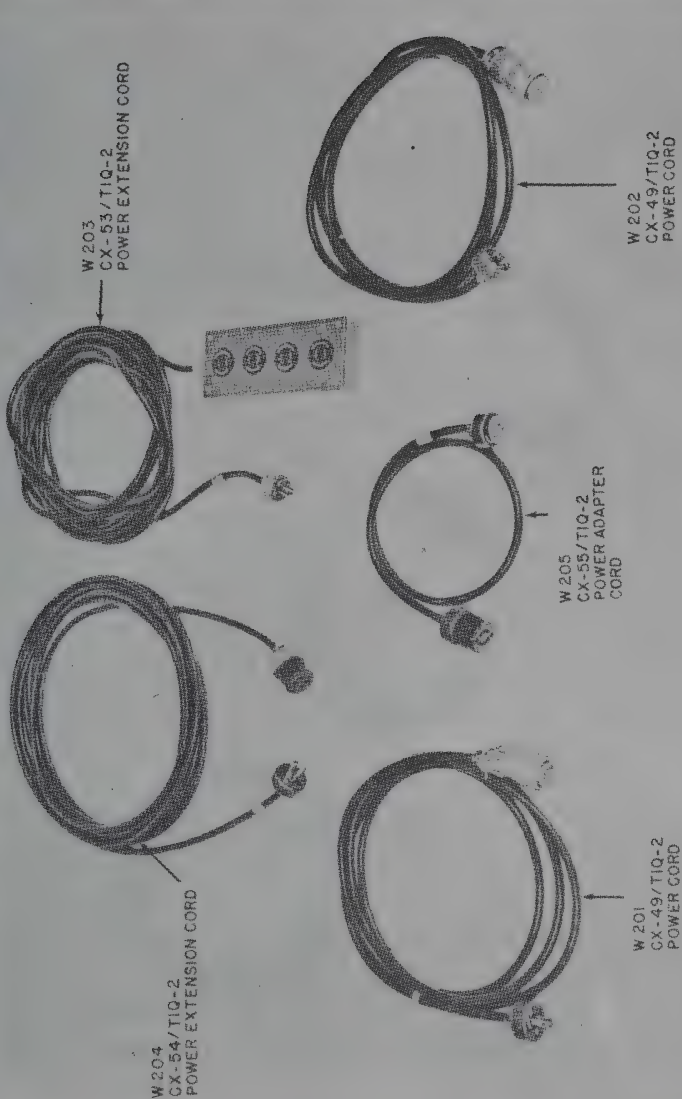
*l. Record Albums.* Three record albums are stored in the speaker case. Each album will hold 12 records.

## 9. Running Spares

A group of running spares is supplied with each PA set. The running spares for the AN/TIQ-2, are located in the spare parts case (fig. 3). The running spares for the AN/TIQ-2A and AN/TIQ-2B are located in the speaker case. Spares are provided for all normally expendable items such as tubes, pilot lamps and fuses. Following is a list of running spares:

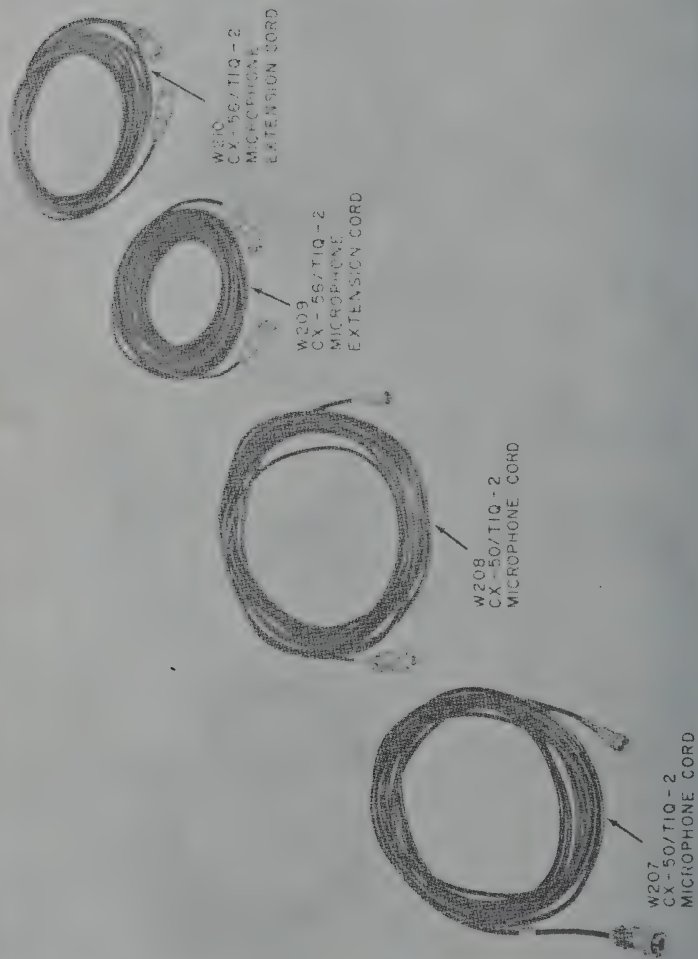
- 10 fuses, 1 ampere.
- 10 fuses, 2 amperes.
- 2 lamps, LM-27.
- 4 needles, A-1M.
- 4 needles, A-3M.
- 1 tube MIL-68L7GT.
- 1 tube MIL-6L6GAY.
- 1 tube MIL-5U4G.





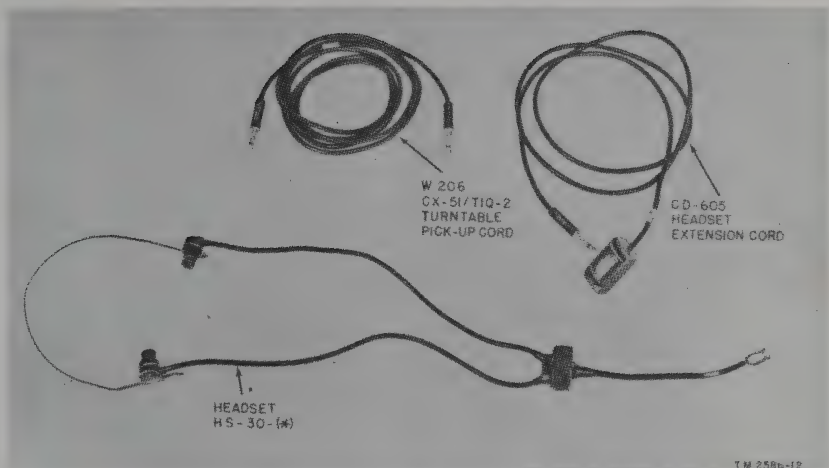
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Figure 7. Power cords, power extension cords, and power adapter cord.



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**Figure 8. Microphone cords and microphone extension cords.**



**Figure 9.** Turntable pickup cord, headset, and headset extension cord.

## 10. Differences in Models

The components of the PA set may be received in different models, but the operation and installation of the models are the same. The differences in the models are explained below:

*a. Amplifiers.* On Amplifier AM-20B/TIQ-2 (modified), there are two fuses and two fuse holders. All the other amplifiers have only one fuse and one fuse holder. Amplifier AM-20B/TIQ-2 (modified) has the letter M painted under the name plate on the upper right corner of the control panel. There are also slight circuit differences.

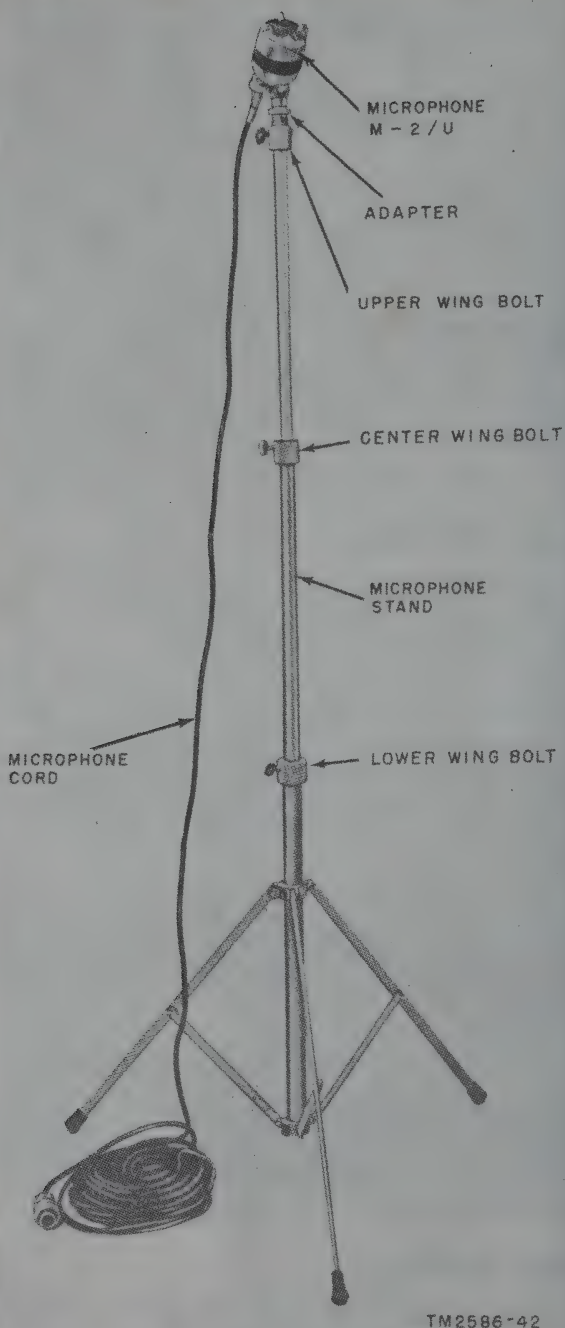
*b. Turntables.*

- (1) Turntable MX-39A/TIQ-2, procured on some orders, is equipped with a spring-clip device, which serves as a rest for the pickup arm. Turntables procured on other orders are equipped with a slotted clamp and a clamping screw that secures the pickup arm.
- (2) A MOTOR switch is provided on some turntables.

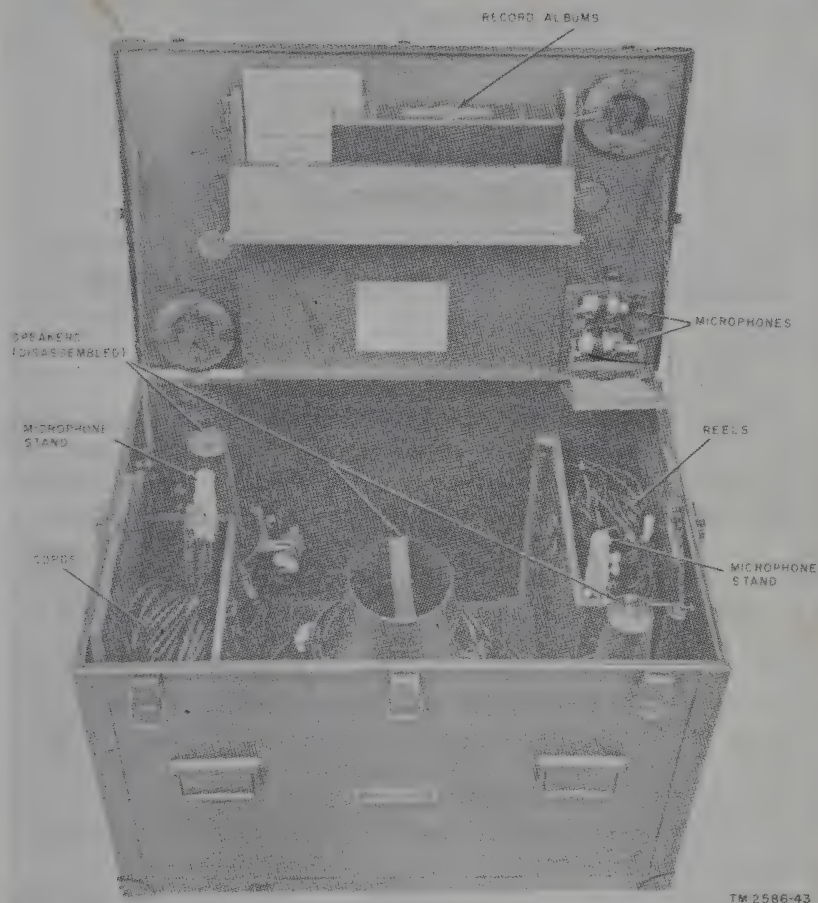
*c. Speaker Case.* The speaker case may be either Case CY-37/TIQ-2 or Case CY-37A/TIQ-2. The microphone stands are carried in a compartment on the underside of the lid of Case CY-37/TIQ-2 and in compartments in Case CY-37A/TIQ-2 (fig. 11).

## 11. Auxiliary Equipment

The following equipment is not supplied with the PA set but may be needed for some types of operation. The chart below lists the auxiliary equipment and its purpose.



*Figure 10. Microphone M-2/U mounted on stand.*



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*Figure 11. Speaker case, Case CY-37A/TIQ-2 and contents.*

Auxiliary equipment	Purpose
Booster amplifier (Amplifier AM-20 (*)/TIQ-2 or equal).	To increase the range of the PA set or to increase the number of speakers that can be used.
Radio Receiver R-100/URR (fig. 19) ---	May be used to furnish radio programs to large groups, by connecting its output to the amplifier.
Power Unit PE-214-(*) (gasoline-engine-driven generator).	Used to supply 120-v or 240-v ac, 60-cycle power where a standard power source is not available.
Vibrator Pack PP-31 (*) (dc converter) or Rotary Converter PU-143 (*)/U.	Used to operate the PA set from 6- to 24-v batteries. This can be used when the PA set is in a jeep or truck or when the PA set is used in a vehicle.



## CHAPTER 2

### INSTALLATION

---

#### Section I. SERVICE UPON RECEIPT OF EQUIPMENT

#### 12. Siting

(fig. 1)

*a.* When the PA set is to be installed inside a building, locate the set near a power source. If the building does not have a source of power, locate the set near a door or window so that the power cables may be extended outside to a nearby power source or auxiliary power unit. Locate the speakers so that the wire connecting the speakers with the amplifiers will not be an accident hazard. Face the speakers so that they cover the entire room or rooms where the sound is to be heard.

*b.* When the PA set is to be used in the field, locate the set if possible in some type of shelter. If a shelter is not available, keep a piece of canvas or cloth handy to cover the equipment in bad weather. If power Unit PE-214-(\*) is used as a power source, locate the power unit as far away as the power extension cords will permit. When locating the speakers, be sure they are upwind and facing the area to be covered.

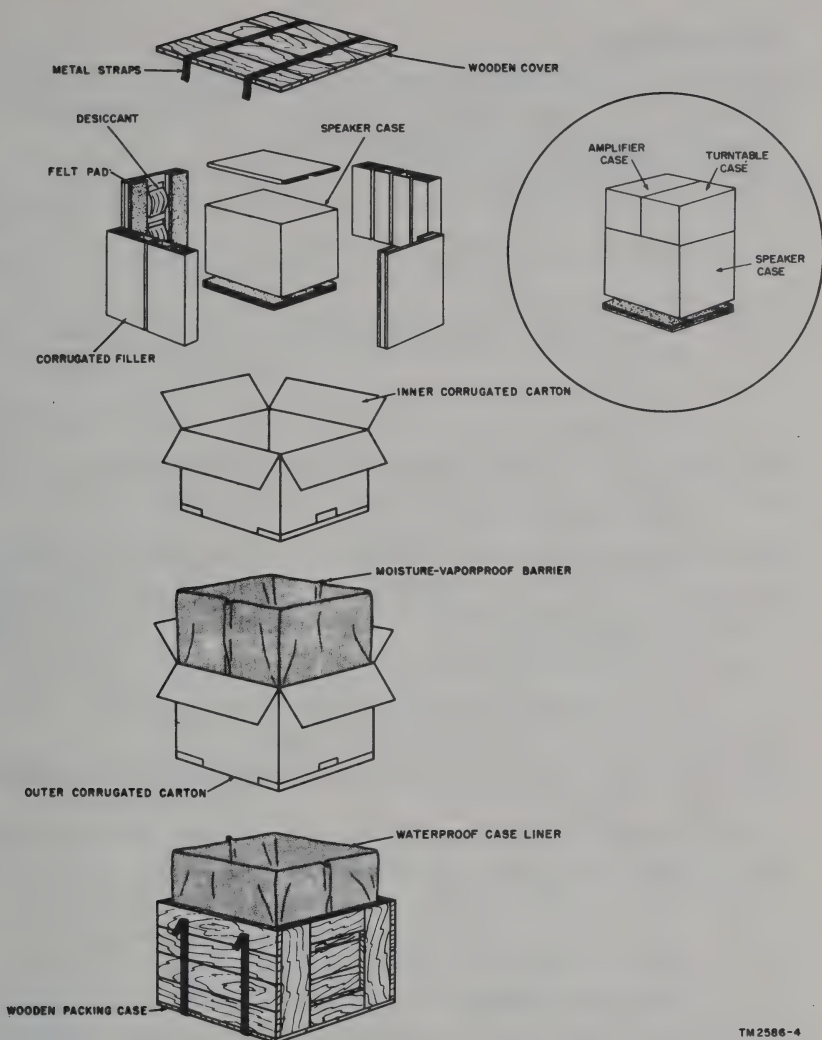
*c.* When the PA set is to be mounted in a vehicle, cushion the set to protect it from vibration. Be sure the operator has access to the controls.

#### 13. Unpacking and Uncrating

*a. General.* When new equipment is received, select a location where the equipment may be unpacked without getting wet or dusty. If possible, unpack the equipment where it will be set up. Be careful when unpacking. Do not push tools into the interior of the case, damage to the equipment may result.

*b. Unpacking.* To unpack the equipment (fig. 12), proceed as follows:

- (1) Place the wooden packing crate near the operating position.
- (2) Cut the metal straps at the top of the crate and bend them back.
- (3) Remove the nails from the top of the wooden packing case with a nail puller.



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Figure 12. Typical packaging diagram.

- (4) Cut through the waterproof case liner, and carefully lift the outer corrugated carton of equipment from the crate.
- (5) Cut through and along the upper edges of the outer corrugated carton on three sides, and fold the top of the carton back.
- (6) Carefully open and remove the moisture-vaporproof barrier.
- (7) Open the inner corrugated carton in the same manner as indicated in (5) above.
- (8) Remove the cushioned component.

## 14. Checking

Check all the components against the packing list. Inspect the equipment for damage and completeness. If the equipment is damaged, fill out the forms that apply (par. 2).

a. Check the amplifier as follows:

- (1) Unlatch the four catch-fasteners that hold the cover and remove the cover from the amplifier.
- (2) Turn each knob and operate each switch to see if they operate smoothly.
- (3) Push the fuse cap or caps in and turn them to the left. Pull out the fuse and fuse cap and check the fuse. Replace the fuse and fuse cap.

**Caution:** Be sure the correct fuse has been installed in each fuse holder to prevent damage to the equipment.

- (4) Remove the six screws from the front of the control panel (three on each side).
- (5) Remove the amplifier from its case and remove the wrappings from the tubes. Inspect the tubes to see that they are properly seated and not broken. Inspect the exposed wiring for broken leads.
- (6) Replace the amplifier in its case, replace the six screws, replace the cover, and fasten the four catch-fasteners.

b. To check the turntable, proceed as follows:

- (1) Unlatch the four catch-fasteners that hold the cover and remove the cover.
- (2) Remove all padding. Operate the switches and check the fuses as described in a(2) and (3) above.
- (3) Spin the platen by hand. Be sure that it turns freely.

*Note.* The platen should drag if the record speed control is in 78 or  $33\frac{1}{3}$  position.

- (4) Unlatch the pick-up arm. Check to see that the arm moves freely from side to side without binding. Replace the pickup arm.
- (5) Replace the cover and fasten the four catch-fasteners.

c. To check the components in the speaker case (fig. 11), proceed as follows:

- (1) Unlatch the five catch-fasteners that hold the cover. Fold back the cover on its hinges. Remove all cushioning material.
- (2) Check to see that there are two microphone stands.
- (3) Check to see that all cords are in their compartments.
- (4) Check to see that there are two microphones.
- (5) Check to see that there are two speaker horns and two mounting units.

- (6) Check to see that there are two technical manuals.
  - (7) If a spare parts case is not provided, check to see that the spare parts are located in the speaker case.
  - (8) Replace the cover and fasten the five catch-fasteners.
- d.* When a spare parts case is provided (fig. 3) check the contents as follows:
- (1) Release the four catch-fasteners on the front of the case.
  - (2) Remove the cover.
  - (3) Remove the cushioning material and check the contents of the two drawers against the list in paragraph 9.
  - (4) Replace the cover.
  - (5) Fasten the four catch-fasteners.

## **15. Service Upon Receipt of Used or Reconditioned Equipment**

- a.* Follow the instructions in paragraphs 13 and 14 for uncrating, unpacking, and checking the equipment.
- b.* Check the used or reconditioned equipment for tags or other signs of changes in the wiring of the equipment. If any changes have been made, note them in this manual, mainly on the schematic diagram.
- c.* Check the operating controls for ease of operation.

## **Section II. ASSEMBLY PROCEDURE**

### **16. Setting Up Amplifier AM-20(\*)/TIQ-2 and Turntable MX-39(\*)/TIQ-2**

- a.* Place the amplifier case on a table or a box whenever possible.
- b.* Release the four catch-fasteners on the sides of the case (figs. 3 and 4).
- c.* Remove the cover.
- d.* Fold the catch-fasteners back out of the way.
- e.* Place the turntable case on top of the amplifier case.
- f.* Fasten the turntable case to the amplifier case by fastening the four interlocking catch-fasteners on the top of the amplifier case to the matching catch-fasteners on the bottom of the turntable case.
- g.* Release the four catch-fasteners on the sides of the turntable case, and remove the cover.
- h.* Fold back the four catch-fasteners on the sides of the turntable case.

### **17. Installing Amplifier AM-20(\*)/TIQ-2 and Turntable MX-39(\*)/TIQ-2 in a Jeep**

- a.* Place a vibrator pack (par. 11) on the back seat of the jeep. Release the two catch-fasteners on each side of the vibrator pack.
- b.* Remove the cover.
- c.* Fold the catch-fasteners out of the way.
- d.* Place the amplifier on top of the vibrator pack.



*e.* Fasten the amplifier to the vibrator pack by fastening the four interlocking catch-fasteners on the top of the vibrator pack to the four mating catch-fasteners on the bottom of the amplifier case.

*f.* Follow the procedures given in paragraph 16*b* through *h* above.

## **18. Setting Up Loudspeaker LS-103(\*)/TIQ-2**

*a.* Remove the speaker horn and the mounting unit from the speaker case.

*b.* Place the speaker horn on the ground with the large end down.

*c.* Insert the long thin end of the mounting unit into the small end of the horn (fig. 13).

*d.* Turn the mounting unit until the four catch-fasteners on the mounting unit are directly over the slotted holes near the small end of the horn.

*e.* Insert the end of the catch-fasteners into the slotted holes and fasten the catch-fasteners.

*f.* Remove the speaker stand from its packaging.

*g.* Move the speaker and the speaker stand to their operating location.

*h.* Hold the speaker stand so that the three legs are pointing to the ground.

*i.* Loosen the lower wing bolt.

*j.* Pull up on the center rod of the stand, and push down on the three legs at the same time.

*k.* Tighten the lower wing bolt.

*l.* Set the speaker stand on the ground so that it is standing on its three legs. If the stand is set up outdoors, the three rubber caps on the legs may be removed and the legs pushed into the ground.

*m.* Loosen the wing bolt on the mounting bushing (fig. 6).

*n.* Tighten the wing nut on the adjustable ratchet on the speaker (fig. 6).

*o.* Lift the speaker and place it with the mounting bushing over the mounting stud on the speaker stand (fig. 13).

*p.* Turn the speaker until the cone faces the area to be covered.

*q.* Tighten the wing bolt on the mounting bushing until the speaker cannot turn on the mounting stud.

*r.* To direct the sound upward or downward, proceed as follows:

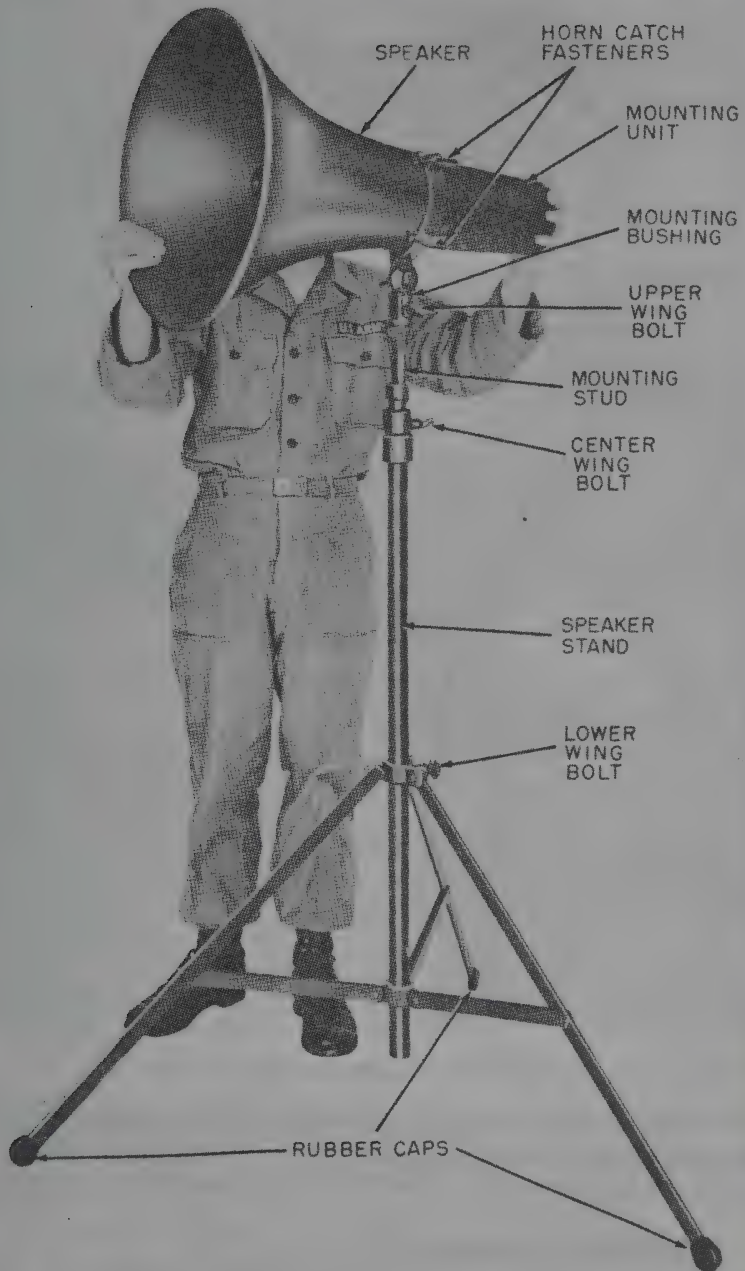
(1) Loosen the wing nut on the adjustable ratchet (fig. 14) on the speaker, until the speaker can swivel up and down.

(2) Tilt the speaker to the desired position (fig. 13).

(3) Tighten the wing nut on the adjustable ratchet. Be sure that the teeth in the adjustable ratchet are engaged.

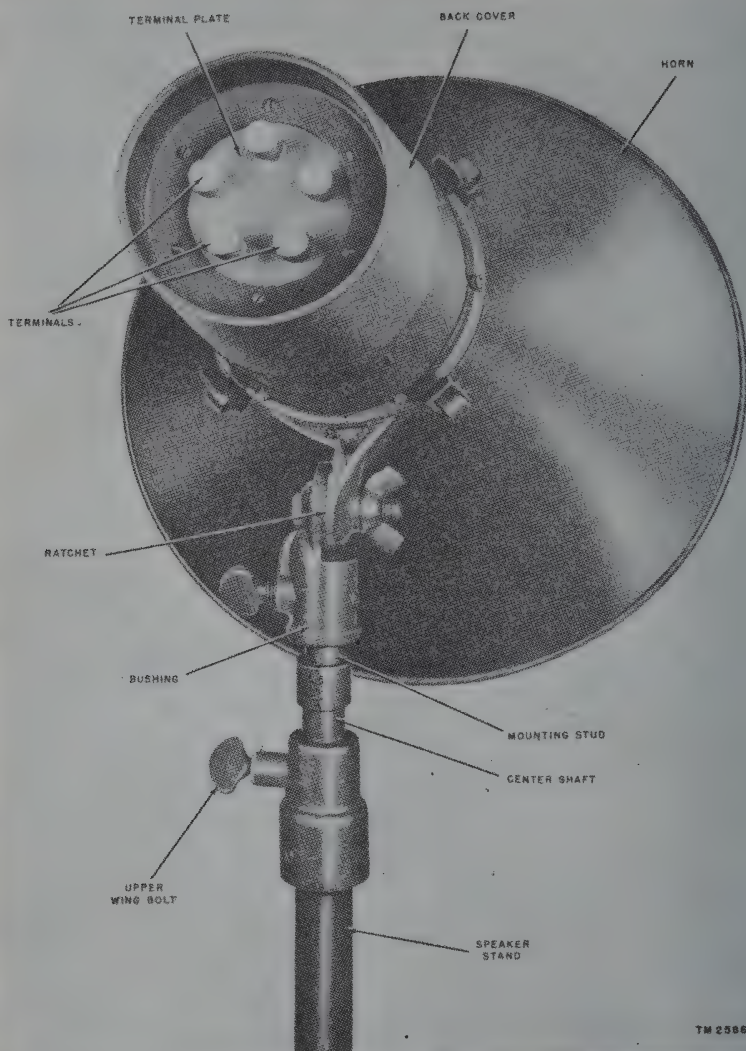
*s.* Before raising the speaker, connect the wire from the amplifier in accordance with the directions in paragraph 26*e*.





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*Figure 13. Placing the speaker on the speaker stand.*



**Figure 14. Speaker on stand.**

*t.* Raise the speaker to the desired height. In areas where there are excessive winds, keep the speaker as close to the ground as possible, and set the stand so that one of the legs is underneath the mounting unit.

- (1) Loosen the upper wing bolt.
- (2) Extend the center shaft (fig. 14) until the speaker is at the desired height.
- (3) Tighten the upper wing bolt (fig. 14).



*Figure 15. Speakers mounted on truck.*

## 19. Mounting Loudspeakers on a Vehicle

*a. Jeeps.* Place the assembled speaker (par. 18) so that the large end of the speaker extends over either side or back of the jeep. Fasten the speaker in position so that it will not move when the jeep is in operation.

*b. Public Address Truck.* When a truck is to be used frequently as a public address truck the assembled speakers may be mounted as shown in figure 15. Be sure that all clamps and mounting bolts are tight before mounting the speaker.

## 20. Setting Up Microphone Stand MT-596(\*)/U and Microphone M-2/U

*a.* Remove the microphone and the microphone stand from the speaker case.

*b.* Loosen the lower wing bolt (fig. 10).

*c.* Push the legs down, and pull the microphone stand up until the legs are extended all the way.

*d.* Tighten the lower wing bolt.

*e.* Place the microphone stand on its three legs.

*f.* Loosen the wing bolt which is second from the bottom.

*g.* Pull up the stand shaft all the way from inside the lower section.

- h.* Tighten the wing bolt that is second from the bottom.
- i.* Loosen the wing bolt that is second from the top.
- j.* Pull up the stand shaft all the way from inside the second section.
- k.* Tighten the wing bolt that is second from the top.
- l.* Loosen the top wing bolt.
- m.* Raise the stand shaft to the desired height.
- n.* Tighten the top wing bolt.
- o.* Screw the microphone to the top of the stand. If the microphone other than the M-2/U is being used, the adapter at the end of the microphone stand may be reversed to fit many of the old type microphones.
- p.* Move the microphone stand to the desired position.

## **21. Using Microphone M-2/U in Vehicle**

When the microphone is used in a vehicle it is not usually mounted on the microphone stand. Use the microphone as a hand microphone (fig. 15). Be sure that the microphone is fastened so that it will not fall or be dropped.

### **Section III. CONNECTING PROCEDURE**

## **22. PA Set Cables**

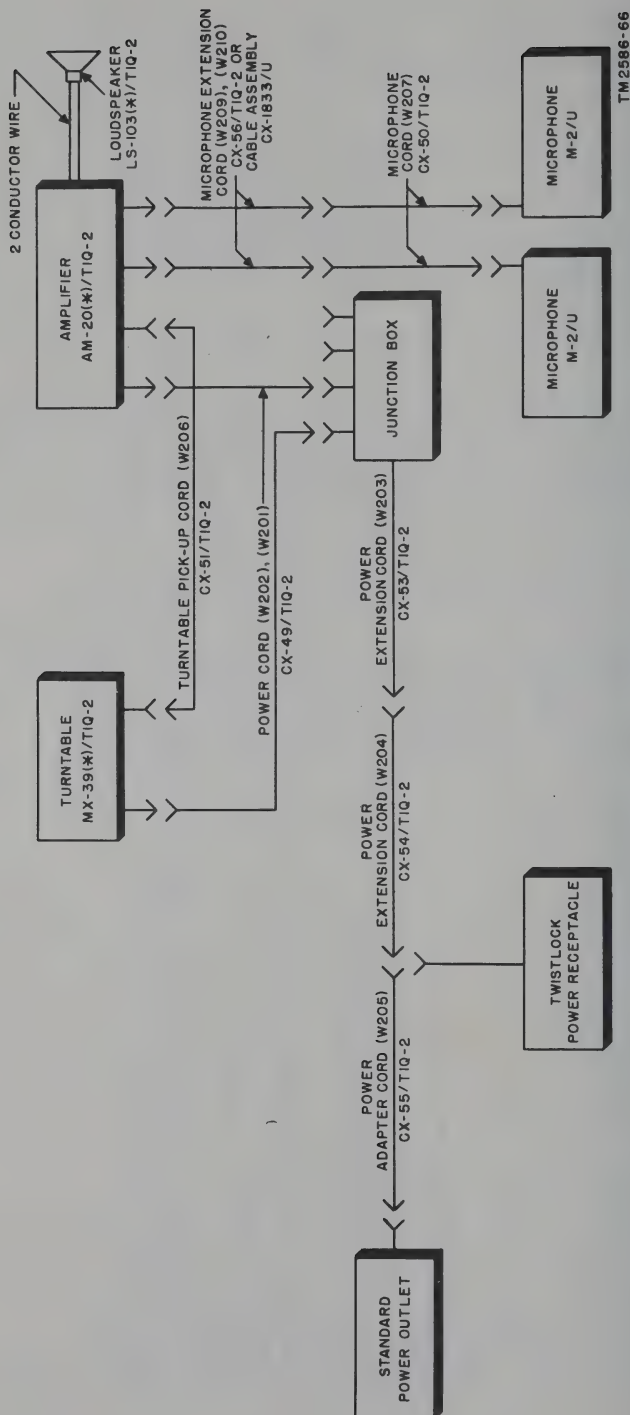
The following chart lists the cables supplied with the PA set and the components which they interconnect (fig. 16).

*Note.* The cable number is stamped into a band which is fastened around each cable.



Cable No.	Cord	Required number	Length (ft)	Connects	
				From--	To--
W201 or W202	{ CX-49/TIQ-2 (power cord) ----- CX-53/TIQ-2 (power extension cord) ----- CX-54/TIQ-2 (power extension cord) ----- CX-55/TIQ-2 (power adapter cord) -----	{ 1	10	Amplifier----- or	Power source.
W203		1	10	Turntable-----	Power source.
W204		1	25	Power source-----	Near the amplifier.
W205		1	25	Power source-----	Cord W203.
		1	3	Power source-----	Cord W203 or cord W204.
W206 or W207	{ CX-51/TIQ-2 (turntable pick-up cord) ----- CX-50/TIQ-2 (microphone cord) ----- CX-56/TIQ-2 (Cable Assembly CX-1833/U on AN/TIQ-2B only) (microphone extension cord).	{ 1	10	Amplifier-----	Turntable.
W208		1	25	Microphone-----	Amplifier.
W209		1	25	Microphone-----	Amplifier.
or		1	25	Microphone cord-----	Amplifier.
W210		1	25	Microphone cord-----	Amplifier.





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Figure 16. Cording diagram.

## **23. Connecting Power to Amplifier**

*a.* Remove the power cord, power extension cords, and power adapter cord from the speaker case. If a standard power receptacle is used, plug the power adapter cord into the power receptacle.

*b.* Plug the power extension cord (W203) (fig. 7) into the receptacle or into the power adapter cord. If the power cord is not long enough, connect the power extension cord (W204) between the power extension cord (W203) and the receptacle or power adapter cord.

*c.* Connect the power cord to the POWER CORD connector (fig. 18) on the lower right corner of the amplifier control panel as follows:

- (1) Insert the power cord into the POWER CORD connector.
- (2) Line up the key in the POWER CORD connector with the keyway in the power cord.
- (3) Push in the power cord connector and, at the same time, screw the power cord connector collar on the threads of the POWER CORD connector.

*d.* Check the power switch to be sure that it is in the OFF position.

*e.* Adjust all control knobs to 0 (zero).

*f.* Insert the power cord into one of the receptacles on power extension cord (W203), and lock it in place by turning it to the right approximately one-fourth turn.

## **24. Connecting Power to Turntable**

*a.* Insert the power cord into the POWER CORD connector. The POWER CORD connector is located to the left of the turntable drawer handle (fig. 18).

*b.* Line up the key with the keyway when making this connection.

*c.* Push in the power cord and, at the same time, screw the collar on the threads of the POWER CORD connector.

*d.* Check the POWER switch to be sure that it is in the OFF position.

*e.* Insert the power cord plug into one of the receptacles on the power extension cord (W203), and lock it in place by turning it to the right approximately one-fourth turn.

## **25. Connecting Turntable Output to Amplifier Input**

*a.* Remove the turntable pick-up cord (W206) (fig. 9) from the speaker case.

*b.* Insert one of the plugs into the TO AMPLIFIER jack (fig. 18) on the turntable).

*c.* Insert the other plug into the PHONO OR LINE jack on the amplifier.

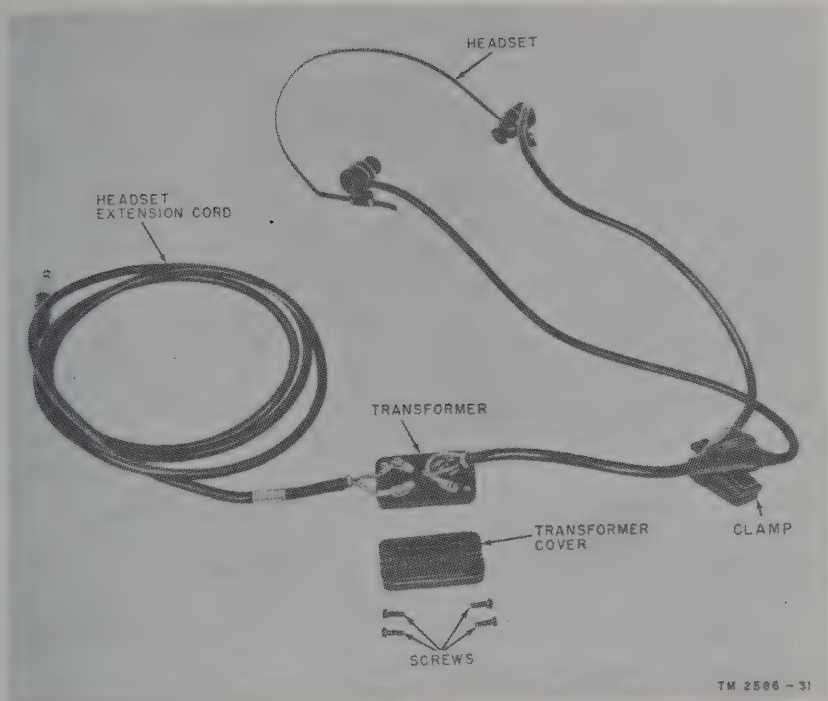
## 26. Connecting Amplifier to Speaker

- a. Remove Reel RL-3 (figs. 3 and 4) from the speaker case.
- b. Loosen the free end of the wire from the reel and tie the wire to the handle of the amplifier case. Leave approximately 1 foot of wire hanging free.
- c. Terminate the wire at the amplifier in the following manner:
  - (1) Connect one of the two wires to the lower terminal of the two terminals marked **SPEAKERS**. The terminals are located on the right side of the amplifier control panel. The lower terminal has a ground symbol marked on the terminal mounting base.
  - (2) Connect the other wire to the upper terminal of the two terminals marked **SPEAKERS**.
- d. Pick up the reel of wire by the handle, and walk to the speaker. Allow the reel to turn as you walk; this will extend the wire from the amplifier to the speaker. In areas where troops are marching or trucks or cars are moving about, tie the wire to trees or on poles. Try to maintain 14 feet between the wire and ground. If there are no poles or trees in the area, lay the wire flat on the ground.
- e. Terminate the wire at the speaker (fig. 14) in the following manner:
  - (1) Connect one of the two wires to the terminal marked 0 (zero) on the terminal strip located on the rear of the mounting unit. This wire should be the same wire that is connected to the lower **SPEAKERS** terminal at the amplifier.
  - (2) Connect the other wire to the terminal (fig. 14) corresponding with the chart below.

Total number of speakers	Terminal on each speaker
1.....	250
2.....	500
4.....	1, 000
6-10.....	2, 500

## 27. Connecting Microphone to Amplifier

- a. Remove the microphone cord (fig. 8) from the speaker case.
- b. Screw the smallest connector on the microphone cord to the microphone connector on the bottom of the microphone.
- c. Extend the microphone cord to the amplifier. If the microphone cord does not reach the amplifier, use the microphone extension cord. Screw the female end of the microphone extension cord to the free end of the microphone cord. Be sure that the key in the microphone



**Figure 17. Connecting headset to headset extension cord.**

extension cord connector is lined up with the keyway in the microphone cord connector.

d. Connect the end of the microphone cord (or the microphone extension cord (fig. 8 if used)) into the jack on the amplifier control panel marked LOW-IMP-MIC-1 (fig. 18).

## **28. Connecting the Headset to the Amplifier**

a. Remove the headset and the headset extension cord (fig. 9) from the speaker case.

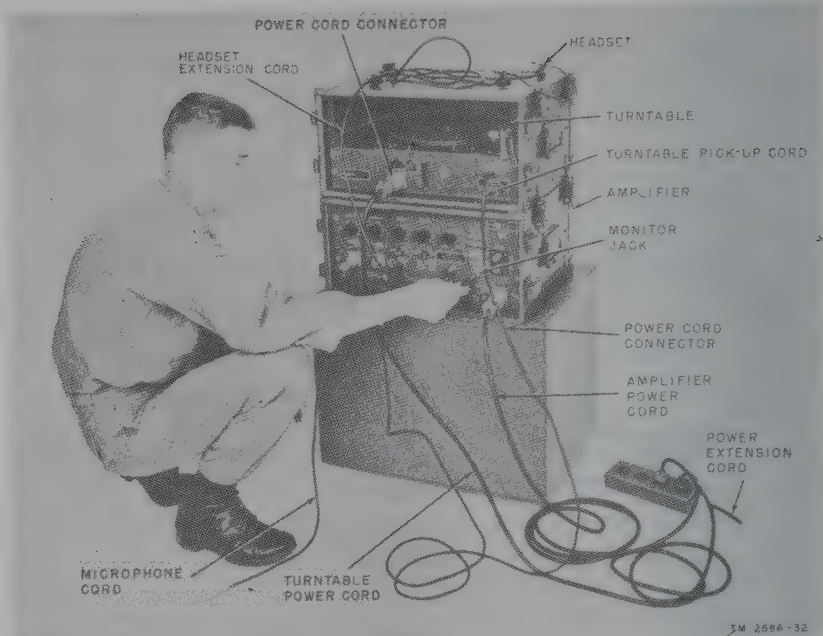
b. Remove the four screws from the cover of the transformer found on the end of the headset extension cord (figs. 9 and 17).

c. Remove the cover of the transformer.

d. Connect the two wires coming from the headset to the two screw terminals on the transformer marked HEADSET. Connect the white wire of the headset on the opposite end but on the same side as the white wire from the headset extension cord. Connect the other wire to the other terminal (fig. 17).

e. Replace the transformer cover and tighten the four screws.

f. Insert the plug on the end of the headset extension cord, into the jack on the amplifier panel marked MONITOR (fig. 18).



*Figure 18. Amplifier and turntable mounted and connected for operation.*

## 29. Connecting Special Telephone Line to Amplifier

To connect a special telephone line to the amplifier, it is necessary to obtain a Plug PL-55. Connect the two wires from the telephone line to the tip and sleeve of Plug PL-55. When this is done, insert the plug into the jack marked LINE.

## Section IV. CONNECTING AUXILIARY EQUIPMENT

### 30. Vibrator Pack PP-31(\*)/TIQ-2

When the PA set must be operated from a 6- or 12-volt storage battery, Vibrator Pack PP-31(\*)/TIQ-2 will be needed. This vibrator pack is described in TM 11-2596, Vibrator Pack PP-31/TIQ-2. In confined areas, the amplifier and turntable may be mounted on top of the vibrator pack. The interlocking catch-fasteners on the top of the vibrator pack and the mating catch-fasteners on the bottom of the amplifier may be fastened together. Before making any connections between the amplifier and the vibrator pack, be sure that all the power switches on the front panel of the vibrator pack are in the OFF position. When using a 6-volt battery supply, be sure that the VOLTAGE SWITCH, on the vibrator pack, can be moved to the 6-volt position only. If not, unscrew the two screws from the angle



bracket and replace the angle bracket in such a position that the switch cannot be moved to the 12-volt position. If a 12-volt battery is used, the same procedure will apply but the switch should be able to move only in the 12-volt position. Connect the power supply to the battery and the amplifier as follows:

- a. Operate all switches to the OFF position.
- b. Remove the three cables from the parts compartment of the vibrator pack. Two of the cords are equipped with battery clips. These are the battery cables. One cord (W2) is 6 feet long and the other (W1) is 12 feet long. The third cord (W3) has an eight-contact connector at each end. This is used to connect the vibrator pack to the amplifier.
- c. Connect the female connector of cord W1 or cord W2 to the INPUT battery connector located on the lower right corner of the vibrator pack.
- d. Connect the battery clip with the black-rubber cover to the negative terminal of the battery.
- e. Connect the clip with the red-rubber cover to the positive terminal of the battery.
- f. Connect the male connector of cord W3 to the AMPLIFIER HIGH VOLTAGE OUTPUT receptacle located in the center of the vibrator pack front panel.
- g. Connect the female connector of cord W3 to the POWER cord connector on the control panel of the amplifier.
- h. Connect the power cord from the turntable to the twistlock receptacle on the lower left side of the vibrator pack control panel.

*Note.* On some Public Address Sets AN/TIQ-2, a jumper wire must be installed on the back of the POWER CORD connector. The jumper wire should connect pin F to ground, so that the PA set can be operated from Vibrator Pack PP-31/TIQ-2.

### **31. Power Unit PE-214-(\* )**

When commercial power is not available, Power Unit PE-214-(\* ) can be used to supply 120 or 240 volts for the operation of the PA set. This power unit is a portable gasoline-engine-driven generator. For complete operation and maintenance information, refer to TM 11-913, Power Unit PE-214-(\* ). To connect the PA set to the power unit, proceed as follows:

- a. Determine the output voltage of the power unit, and prepare the power selector switch on the amplifier (figs. 23 and 24) and the POWER switch on the turntable (figs. 21 and 22) for this voltage.
- b. Plug the power cords or power extension cords of the amplifier and turntable into the twistlock receptacles at the end of the generator housing.

## 32. Booster Amplifier

A booster amplifier may be used to increase the area to be covered by the PA set. The booster amplifier may be an additional Amplifier AM-20(\*)/TIQ-2. Only one amplifier comes with the PA set; therefore another amplifier must be requisitioned. To connect the two amplifiers, prepare a rubber-covered, single-conductor, shielded cable with a Plug PL-55 at one end and a five-pin multiple-contact male connector at the other end. On Plug PL-55, connect the conductor of the cord to the tip of the plug. Connect the shield of the cord to the sleeve of the plug. On the multiple-contact connector, connect the conductor to pin D and the shield to pin A. When the cable is made, connect the two amplifiers together in the following manner:

- a. Insert Plug PL-55 into the jack on the *booster* amplifier marked PHONO OR LINE.
- b. Connect the multiple-contact connector to the receptacle on the main amplifier marked BOOSTER.
- c. Connect the booster amplifier to the power source as outlined in paragraph 23.

## 33. Radio Receiver R-100/URR

This radio receiver may be used to provide radio programs to large groups by connecting its output to the PA set. For information concerning the radio, refer to TM 11-310, Schematic Diagrams for Maintenance of Ground Radio Communication Sets. Connect the radio to the amplifier as outlined below.

- a. Remove the turntable pick-up cord from the speaker case.
- b. Insert Plug PL-55 at one end of the cord into the jack on the radio marked OUTPUT (fig. 19).
- c. Insert Plug PL-55 on the other end of the cord into the jack on the amplifier control panel marked RADIO.

## 34. Rotary Converter PU-143(\*)/U

This converter can be used to operate the PA set from a 24-volt dc source. For information concerning the converter, refer to TM 11-984, Rotary Converter PU-143A/U. Connect the converter as follows:

- a. Connect the input leads from the converter to a 24-volt battery.
- b. Insert the power extension cord (W203 or W204) into the receptacle on the converter.

## Section V. PREOPERATIONAL PROCEDURE

### 35. General

The installer must set switches, control knobs, and make tests on the AN/TIQ-2 (\*) before the PA set can be turned over to the op-

erator. Paragraph 37 lists the controls and their uses. The control settings that must be made by the operator are described in paragraphs 38 through 46. The preoperational testing procedure is given in paragraph 36.

### **36. Preoperational Testing**

Check the PA set to see if it is in good working condition after completing installation. Use the equipment performance checklist (par. 67) as a guide. Perform each check (items 1 through 14 in *a* and items 1 through 8 in *b*) in the order given. When the PA set has been completely checked, turn it over to the operator. If the equipment is not to be used for an extended period of time, turn off the auxiliary equipment (if used) and the power to the PA set.

## CHAPTER 3

### OPERATION

#### Section I. CONTROLS AND SETTINGS

#### 37. Controls

The charts below list the controls and give their use.

*a. Amplifier* (figs. 23 and 24).

Controls	Use
MICROPHONE 1.....	Increases or decreases the output volume of the amplifier when a microphone is connected to the HI-IMP-MIC-1 receptacle or the LOW-IMP-MIC-1 receptacle.
MICROPHONE 2.....	Increases or decreases the output volume of the amplifier when a microphone is connected to the HI-IMP-MIC-2 receptacle or LOW-IMP-MIC-2 receptacle.
PHONO OR LINE.....	Increases or decreases the output volume of the amplifier when the input to the amplifier is connected to the PHONO OR LINE jack.
RADIO OR CARBON MIC.....	Increases or decreases the output volume of the amplifier when the input to the amplifier is connected to the RADIO jack or the CARBON MICROPHONE jack.
TONE.....	Affects the voice or music so that the high or low notes will be clearer.
PHONO-LINE.....	Changes the circuit of the PHONO OR LINE jack so that it may be used when the input to the amplifier is from the turntable (PHONO (high impedance) position) or from a special telephone circuit (LINE (low impedance) position).
RADIO-C. MIC.....	Selects the circuit from the RADIO jack or the CARBON MICROPHONE jack when the input circuit to the amplifier comes from a radio (RADIO jack) or from a carbon microphone (CARBON MICROPHONE jack).
INDICATOR LAMP.....	Glowes when the power switch is operated to the ON position and power is being supplied.
Power switch.....	Opens and closes the circuit for power.
Power selector switch.....	Changes the connections of the power transformer to use 115 volts or 230 volts as a source of power.

*b. Turntable (figs. 21 and 22).*

Controls	Use
POWER selector switch.....	Opens and closes the circuit for power. Changes the connections of the power transformer to use 115 volts or 230 volts as a power source.
Speed selector lever.....	Changes the gears in the turntable gear box so that the turntable platen will turn at 33 $\frac{1}{3}$ rpm or 78 rpm.
Speed control lever.....	Controls the speed of the turntable approximately 10 percent when the turntable platen is turning. Compensates for loss of speed when operating on 50 cycles ac.
TURNOVER KNOB.....	Selects one of two types of needles that are in the pickup head. One needle is used on standard records and the other needle is used for long playing (microgroove) records.
MOTOR ON-OFF (on some models of MX-39/TIQ-2).	Opens and closes the power circuit of the turntable motor.

*c. Auxiliary Equipment.*

Controls	Use
Booster amplifier (same as <i>a</i> above). Vibrator Pack PP-31(*)/TIQ-2. 6 OR 12 VOLT DC INPUT group, VOLTAGE SWITCH.....	Sets up the circuit of the vibrator for operation on 6 volts or 12 volts.
AMPLIFIER HIGH VOLTAGE group. Amplifier power switch.....	Extends power to the AMPLIFIER POWER CONNECTOR when switch is on.
Amplifier power pilot.....	Glow when power is on and is being extended to the amplifier.
PHONO 115 VOLTS AC OUTPUT group. Phonograph power.....	Extends power to the turntable when the phonograph power switch is on.
Phonograph power pilot lamp.....	Glow when power is on and is being extended to the turntable.
Radio Receiver R-100/URR. VOLUME CONTROL.....	Used to turn the radio on and off and increase or decrease the output volume.
FREQUENCY SELECTOR.....	Used to select the desired frequency range.
MAIN TUNING.....	Used to select the desired station.



## 38. Control and Switch Settings

Before turning on any of the components of the PA set, certain switches and controls on the amplifier must be preset in the following manner:

- a. Set the following controls to 0 (zero).
  - (1) MICROPHONE 1.
  - (2) MICROPHONE 2.
  - (3) PHONE OR LINE.
  - (4) RADIO OR CARBON MIC.
  - (5) TONE.
- b. Set the PHONO-LINE switch to the proper position as indicated below.
  - (1) If the input to the amplifier is from the turntable, operate the switch to PHONO.
  - (2) If the input to the amplifier is from a special telephone connection, a low impedance phonograph, or if the amplifier is a booster amplifier, operate the switch to LINE.
- c. Set the RADIO-C. MIC. switch to the proper position as indicated below.
  - (1) Operate the switch to RADIO if the input to the amplifier is from a radio through the RADIO jack.
  - (2) Operate the switch to C. MIC. if the input to the amplifier is from a carbon microphone through the CARBON MICROPHONE jack.

## Section II. OPERATION UNDER USUAL CONDITIONS

### 39. General

The operator turns the equipment on and off, plays records, and adjusts the loudness and tone of the sound coming from the speakers. When auxiliary equipment such as the radio receiver is used, the operator will select the desired station. Before trying to operate the PA set, be sure that it has been tested by the maintenance man.

### 40. Starting Auxiliary Equipment

When auxiliary equipment is to be used in the operation of the PA set, it will be necessary to start the auxiliary equipment. The following subparagraphs describe the steps necessary to start and adjust this equipment.

a. *Power Unit PE-214-(\*)*. To start the power unit, proceed as outlined in TM 11-913. Do not start the power unit when the load is attached. Allow the power unit to run for 15 minutes before putting on the load.

b. *Vibrator Pack PP-31 (\*)/TIQ-2*. Set the VOLTAGE SWITCH to 6 volts if a 6-volt battery is used. Set the switch to

12 volts if a 12-volt battery is used. Push the amplifier power SWITCH to ON. Push the turntable power SWITCH to ON.

*c. Rotary Converter PU-143 (\*)/U.* Operate the switch or connect the wire that controls the 24 volts dc to the converter. When the converter is operating, insert the power extension cord into the receptacle on the converter.

*d. Radio Receiver R-100/URR.* Turn the FREQUENCY SELECTOR switch to the left or right until the white dot on the knob is lined up with the desired frequency band. Turn the VOLUME CONTROL to the right until a click is heard; continue to turn it to the right until the volume at the speaker is correct. Turn the MAIN TUNING knob until the pointer on the dial plate is pointing to the station desired.

*e. Booster Amplifier.* Operate all controls and switches as outlined for the amplifier in paragraph 38.

## **41. Starting Amplifier**

*a.* Start the amplifier by setting the power switch to the ON position. The indicator lamp (fig. 23) should light. Allow a few minutes for the tubes in the amplifier to warm up.

*b.* Place the wire band, which holds the earphones, across the top of the head. Adjust the earplug so that it fits directly in the ear with the wire band resting across the top of the head. Fasten the clamp (fig. 17) on the headset cord to the clothing, but allow enough slack to permit proper movement of the head. This clamp will also prevent the weight of the transformer and the headset extension cord from disturbing the position of the headset.

## **42. Using the Radio**

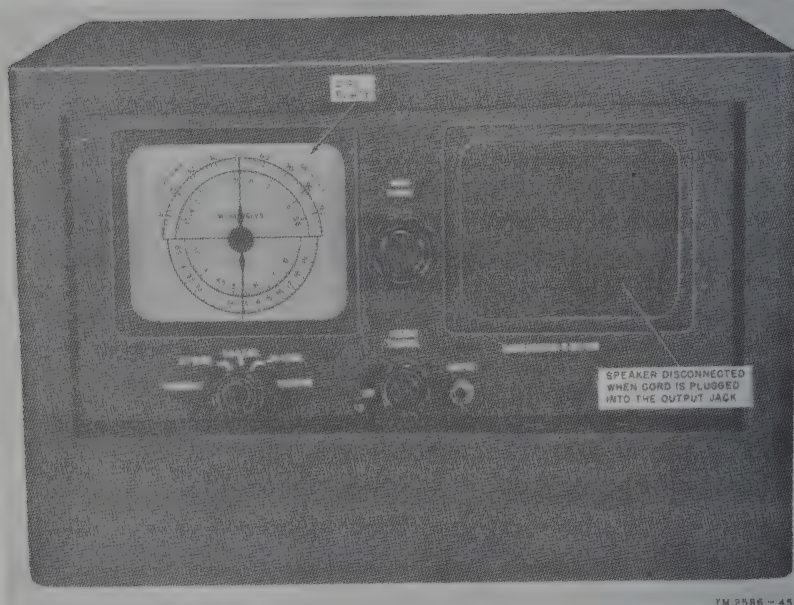
To use the radio (fig. 19) with the PA set, turn the radio on by turning the VOLUME CONTROL to the right until a click is heard. Turn the VOLUME CONTROL to the right to the approximate setting. While the tubes in the radio are warming up, proceed as follows:

*a.* Set the FREQUENCY SELECTOR switch to the desired group of stations. For all the normal radio stations, turn the knob all the way to the right.

*b.* Turn the MAIN TUNING knob to select the desired station, as indicated by the numbers on the dial plate.

*c.* To play the radio louder, turn the VOLUME CONTROL to the right. To play the radio softer, turn the VOLUME CONTROL to the left. When the sound from the speakers is normal, do not touch the VOLUME CONTROL again. Use the knob mentioned in paragraph 44 to change the loudness of the sound.

*d.* To turn the radio set off, turn the VOLUME CONTROL to the left until a click is heard.



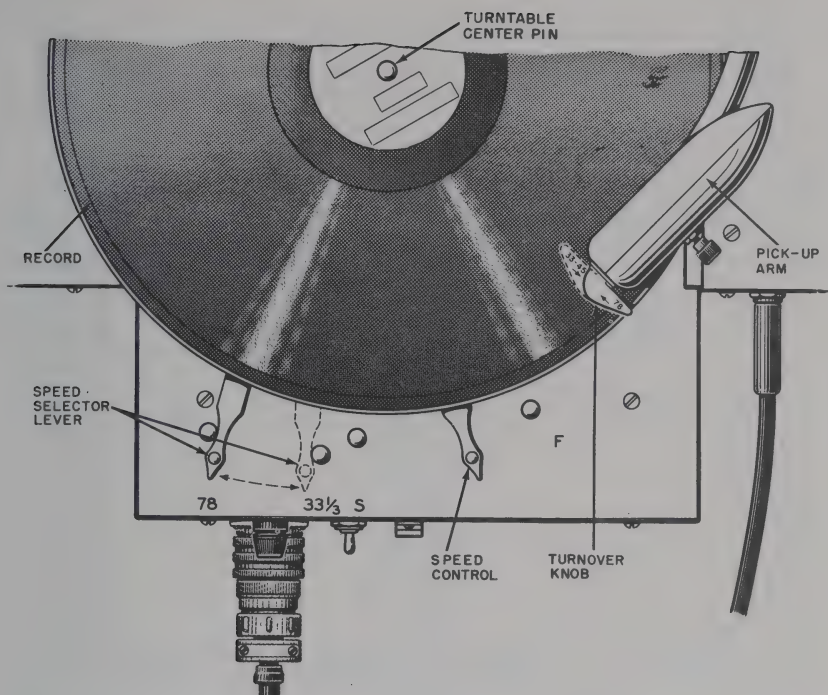
*Figure 19. Radio Receiver R-100/URR.*

### 43. Playing Records

To play records on the turntable, proceed as follows:

- a. Pull out the turn table drawer.
- b. Place the record to be played on the turntable platen. The side of the record to be played must face upward, and the hole in the center of the record must be set over the turntable center pin (fig. 20).
- c. Set the speed selector lever as indicated below.
  - (1) If the record to be played is 78 rpm, push the speed selector lever to the left to the position marked 78 (fig. 20).
  - (2) If the record to be played is  $33\frac{1}{3}$  rpm record, push the speed selector lever to the right to the position marked  $33\frac{1}{3}$ .
- d. Set the turnover knob on the pickup arm to the correct position as indicated below.
  - (1) On standard 78-rpm records, push the turnover knob to the right. The number 78 should be facing upward.
  - (2) On long playing records,  $33\frac{1}{3}$ -rpm records, push the turnover knob to the left. The number 33-45 should be facing upward.
- e. Push the POWER switch (figs. 21 and 22) from the OFF position to the 115 or 230 position. It will move in only one of the two positions. On some equipments, there may be a MOTOR switch (fig. 21). Push the MOTOR switch to the ON position.
- f. Loosen the clamping screw found on the right side of the pickup arm (fig. 20).





TM 2 586 -36

*Figure 20. Turntable drawer extended, showing positions of speed selector lever and turnover knob.*

*g.* Lift the pickup arm and move it to the left. On some equipment, the pickup arm rest will have to be squeezed together before the pickup arm can be lifted. Gently lower the pickup arm until the needle touches the first groove on the outer edge of the record. To make the sound louder or softer, follow the instructions in paragraph 45.

*h.* To control the speed of the record, proceed as follows:

- (1) To make the record turn slower, push the speed control lever to the right to the position marked S (fig. 20).
- (2) To make the record turn faster, push the speed control lever to the left to the position marked F (fig. 20).

*i.* When the record has finished playing, lift the pickup arm off the record. Move the pickup arm to the right; then lower it until the clamping screw is resting in the notch of the pickup arm rest.

*j.* Push the POWER switch or MOTOR switch to OFF. Change the record. Push the POWER switch or MOTOR switch to ON. Follow the directions in *g* and *i* above.

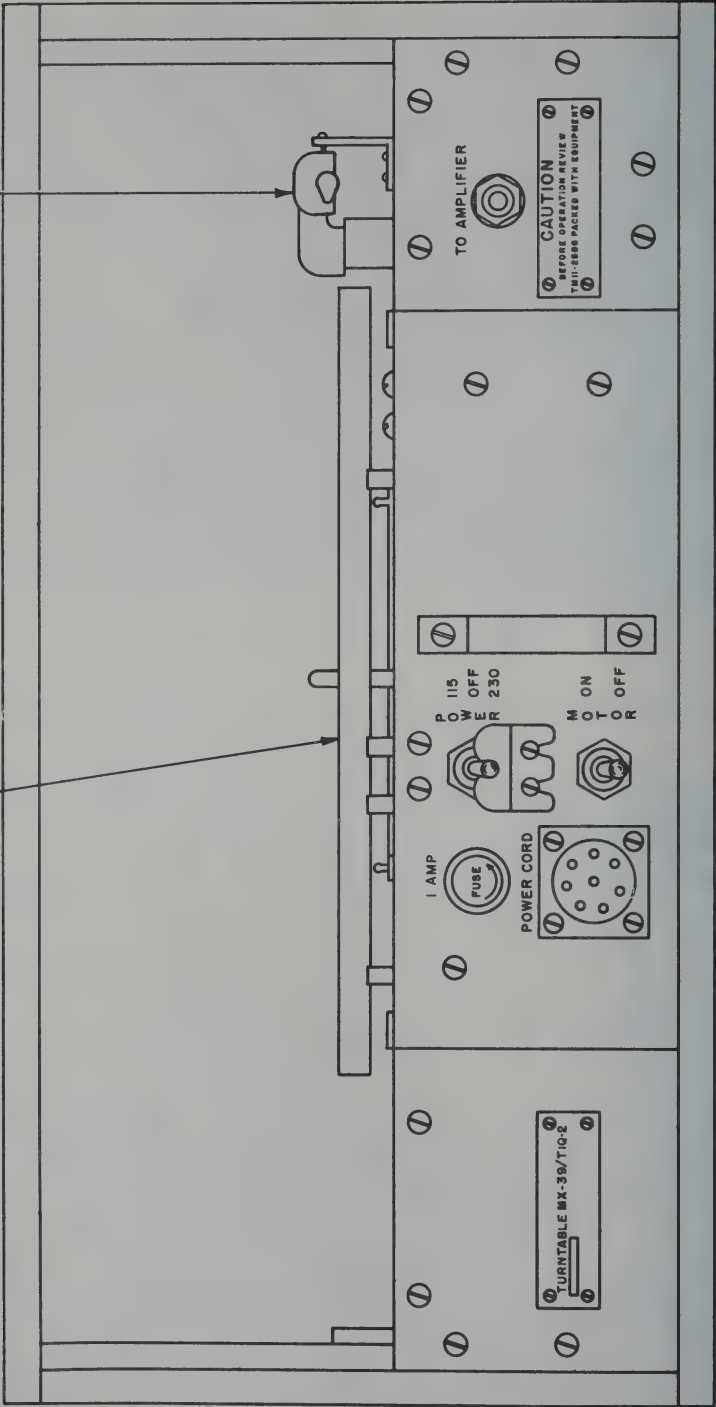
*k.* When the last record to be played is finished and the POWER switch is in the OFF position, push the MOTOR switch (if there is one) to the OFF position.

*l.* Tighten the clamping screw to the pickup arm rest.

*m.* Remove the record from the turntable.

TURNTABLE PLATEN

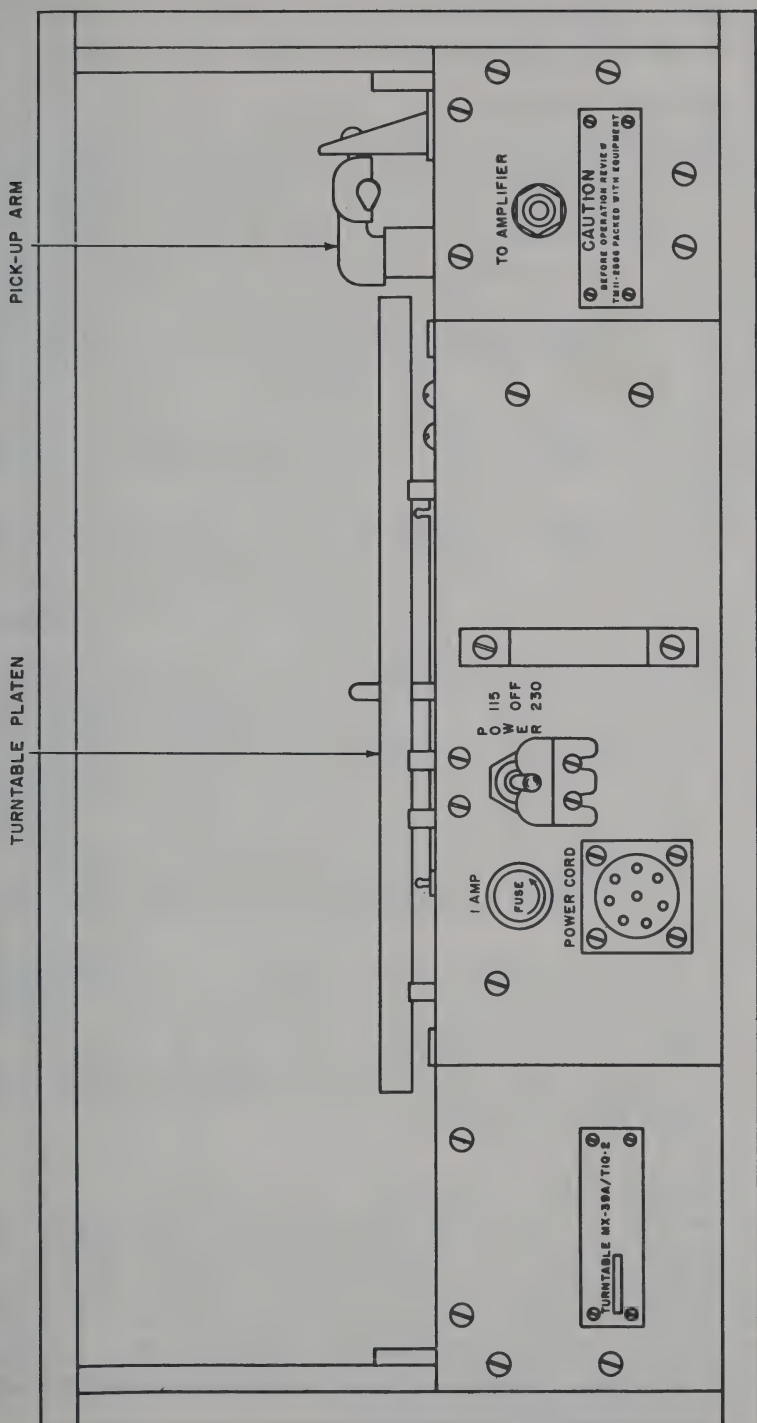
PICK-UP ARM



TM 2586-5

Figure 21. Turntable MX-39/TIQ-2, front view.





TM 2586-6

Figure 22. Turntable MX-39A/TIQ-2, front view.

- n. Push in the turntable drawer.
- o. Put the record in the album.

## 44. Adjusting Loudness

a. *General.* Use the four knobs marked MICROPHONE 1, MICROPHONE 2, PHONO or LINE, and RADIO OR CARBON MIC. (located at the top of the amplifier panel (figs. 23 and 24)) to make the sound coming from the speakers louder or softer. To make the sound louder, turn the knobs to the right. If the knobs are turned too far to the right, the sound will become a squeal; turn the knobs to the left until the squealing stops. To make the sound softer, turn the knobs to the left. The subparagraphs below describe the use of each knob.

b. *MICROPHONE 1.* Use this knob when a microphone is in use and connected to the connector marked HI-IMP-MIC-1 or LOW-IMP-MIC-1.

c. *MICROPHONE 2.* Use this knob when a microphone is in use and connected to the connector marked HI-IMP-MIC-2 or LOW-IMP-MIC-2.

d. *PHONO OR LINE.* This knob is used for two different hookups.

(1) When the PHONO-LINE switch is in the PHONO position and the cord that is plugged into the PHONO OR LINE jack comes from the turntable.

(2) When the PHONO-LINE switch is in the LINE position and the cord that is plugged into the PHONO OR LINE jack comes from a special telephone line or when a booster amplifier or low impedance phonograph is being used.

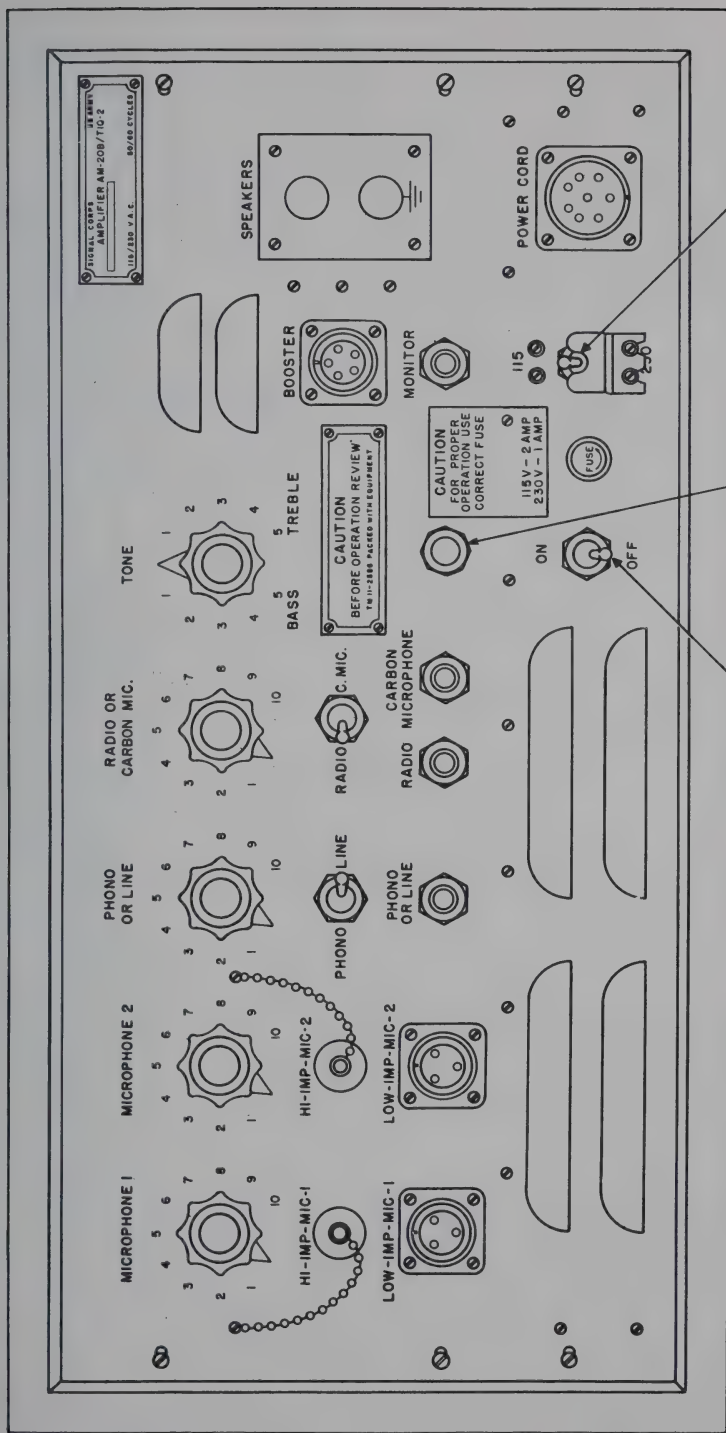
e. *RADIO OR CARBON MIC.* This knob is used for two different hookups.

(1) When the RADIO-C. MIC. switch is in the RADIO position and a cord from a radio is plugged into the RADIO jack.

(2) When the RADIO-C. MIC. switch is in the C. MIC. position and a cord from a microphone is connected to the CARBON MICROPHONE jack.

## 45. Adjusting Tone

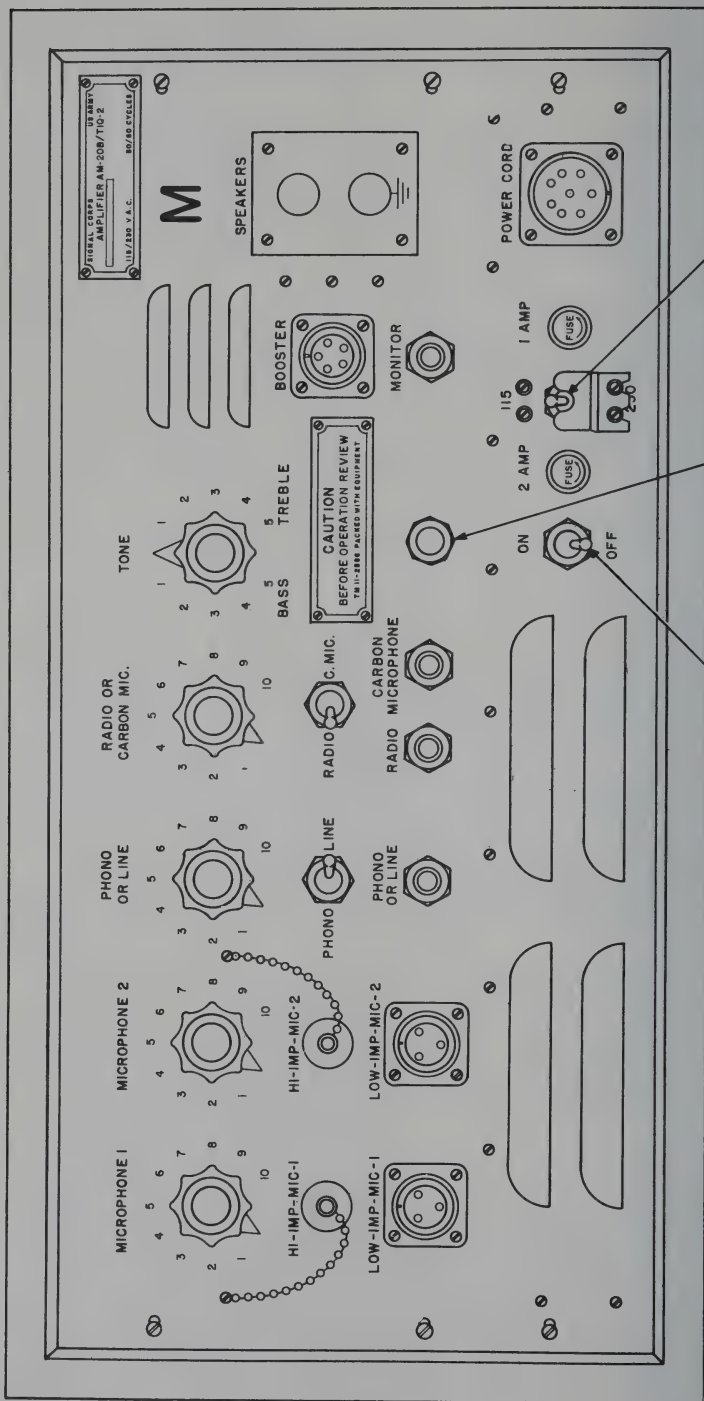
Use the knob on the amplifier panel marked TONE (figs. 23 and 24) to make the voice or music sound deeper or higher. To make it sound deeper, turn the knob to the left in the direction of the position marked BASS. To make it sound higher, turn the knob to the right in the direction of the position marked TREBLE. There are five marks on each side. Turn the knob one mark at a time until the best tone is heard coming from the speakers.



POWER SWITCH INDICATOR LAMP POWER SELECTOR SWITCH

Figure 23. Amplifiers AM-20/TIQ-2, AM-20A/TIQ-2, and AM-20B/TIQ-2, control panel.

TM2586-7



TM2586-8

Figure 24. Amplifier AM-20B/TIQ-2 (modified), control panel.

## **46. Using Booster Amplifier**

To operate the booster amplifier, proceed as follows:

- a.* Push the power switch to the ON position. Wait a few minutes for the tubes in the booster amplifier to warm up.
- b.* Use the knob marked PHONO OR LINE on the main amplifier to make the sound from the PA set speakers louder or softer.
- c.* When the knob on the main amplifier marked PHONO OR LINE is turned all the way to the right and a louder sound from the speakers is desired, use the PHONO OR LINE knob on the booster amplifier.
- d.* Use the knob on the main amplifier marked TONE to make the sound coming from the speakers higher or lower.
- e.* When the operation is finished, shut off the booster amplifier by pushing the power switch to OFF.

## **Section III. OPERATIONS UNDER UNUSUAL CONDITIONS**

### **47. General**

Operation of the PA set is often difficult in places where extreme cold, heat, moisture, and sand conditions are present. Paragraphs 48 through 50 provide instructions for reducing the effects of these conditions.

### **48. Operation in Arctic Climates**

Temperature below zero and conditions that result from cold weather affect the working condition of this equipment. Instructions and cautions for the operation of this equipment in arctic climates follow:

- a.* Handle the equipment carefully.
- b.* If possible, set the equipment up in heated shelters.
- c.* Keep a clean dry cloth over the microphone when it is used in a cold room or in the open air. This will prevent frost from forming on the microphone and causing damage.
- d.* When using the headset, wear a woolen cap and pull it down over the receivers, so that moisture in the receivers will not freeze and damage the unit.
- e.* The rise and fall of the temperature may cause moisture to form on the equipment. This moisture may freeze and damage parts of the equipment. Try to keep the PA set at an even temperature.
- f.* When operating from batteries, keep the batteries warm. Cold batteries wear out quicker than warm batteries.

### **49. Operation in Tropical Climates**

When operated in tropical climates, the PA set should be in a shelter. In these climates, the large amount of moisture in the air generally



affects the equipment. When the temperature of the equipment falls below the temperature of the surrounding air, moisture will form on the equipment. Inspect and clean the equipment often to prevent rust, corrosion, and fungus growth. Keep the equipment dry.

## **50. Operation in Desert Climates**

*a.* When operating in desert areas, keep the equipment under shelter. Sand, dust, and wind will damage the moving parts of the turntable. Clean the equipment often with a clean dry cloth.

*b.* In the morning when the outside temperature rises, moisture will form on the equipment. This moisture will collect dust and dirt and will also cause rust, corrosion, and fungus growth. Keep the equipment as dry as possible. Clean the equipment often.

*c.* Never tie wiring to the inside or outside of tents. A sudden wind may blow the tent away and wires may break or damage the equipment.

*d.* Make preventive maintenance checks more often than usual.

## CHAPTER 4

### ORGANIZATIONAL MAINTENANCE

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#### Section I. TOOLS AND MATERIAL

##### 51. General

The tools, parts, supplies, and test equipment necessary to perform organizational maintenance are authorized by appropriate publications. The tools and materials are not supplied with the PA set but must be requisitioned through normal supply channels.

##### 52. Tools, Test Equipment, and Materials Required for Public Address Set AN/TIQ-2(\*)

Tools and materials required for organizational maintenance of the PA set are listed in *a* and *b* below. Items contained in Tool Equipment TE-41 are listed in Department of the Army Supply Manual SIG 6-TE-41.

*a. Tools and Test Equipment.*

Tool Equipment TE-41.

Multimeter TS-352/U.

Tube Tester TV-7/U.

*b. Materials.*

Sandpaper No. 000.

Electrical Tape TL-83.

Solder M-31.

Soldering flux.

Purple varnish.

Wire, electrical No. 18 AWG.

Cleaning brush.

Handle TL-215.

Carbon tetrachloride.

Lint-free cloth.

Friction tape.

Nonadhesive tape (arctic use only).

#### Section II. PREVENTIVE MAINTENANCE SERVICES

##### 53. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment (usually when the equipment is not in use) to keep it in good working order

so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from troubleshooting and repair since its object is to prevent certain troubles from occurring.

## 54. General Preventive Maintenance Techniques

*a.* Use No. 000 sandpaper to remove corrosion.

*b.* Use a clean, dry, lint free cloth or a dry brush for cleaning. If the dry cloth or brush will not remove the dirt, use one of the following techniques, as applicable:

- (1) When cleaning electrical contacts, use a cloth moistened with carbon tetrachloride; when the contacts are clean, wipe them dry with a *dry* cloth.

**Caution:** Repeated contact of carbon tetrachloride with the skin or prolonged breathing of the fumes is dangerous. Make sure adequate ventilation is provided.

- (2) When cleaning surfaces that perform no electrical function, use a cloth or brush moistened with solvent, dry cleaning, (SD); after cleaning, wipe parts dry with a *dry* cloth.

*c.* If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch (psi) to remove dust from inaccessible places; be careful, however, or mechanical damage may result.

**Caution:** When using compressed air, always direct the first blast toward the floor. This procedure is necessary to clear condensed moisture from the air line.

## 55. Use of Preventive Maintenance Forms

*a.* The decision concerning the items on DA Forms 11-250 and 11-251 that are to be applied to this equipment is a tactical decision to be made in the case of first echelon maintenance by the communications officer/chief or his designated representative, and in the case of second and third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

*b.* Circled items of figures 25 and 26 are partially or totally applicable to Public Address Set AN/TIQ-2(\*). Reference in the ITEM column are to paragraphs that contain additional detailed information.

## 56. Performing Preventive Maintenance

Subparagraphs *a* through *c* below are a suggested schedule of preventive maintenance of the PA set. The operations indicated should be performed at the intervals indicated, unless the intervals are changed by the local commander.

<b>OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT</b> <b>PUBLIC ADDRESS, RECORDER, REPRODUCER</b>											
<i>INSTRUCTIONS: See other side</i>											
EQUIPMENT NOMENCLATURE						EQUIPMENT SERIAL NO.					
<b>PUBLIC ADDRESS SET AN/TIQ-2 (*)</b>											
<b>LEGEND FOR MARKING CONDITIONS:</b> ✓ Satisfactory; X Adjustment, repair or replacement required; (1) Defect corrected. <b>NOTE: Strike out items not applicable.</b>											
DAILY											
NO.	ITEM	CONDITION									
		S	M	T	W	T	F	S			
1	INSPECT UNIT FOR COMPLETENESS - MICROPHONE, HEADSET, CORDS, CABLES, ACCESSORIES, RUNNING SPARES. PAR. 56a(1)										
2	CLEAN EXTERIOR OF COMPONENTS OF DIRT, GREASE, GRIME, CORROSION, OIL. PAR. 56a(2)										
3	CLEAN PLUGS AND ELECTRICAL CONNECTIONS OF CORROSION, TARNISH, DIRT, DUST, GREASE, OIL. PAR. 56a(3)										
WEEKLY											
NO.	ITEM	COND. TYP.	NO.	ITEM	COND. TYP.						
4	INSPECT EXTERIOR OF COMPONENTS FOR RUST, CORROSION, LOOSE OR MISSING SCREWS, CHIPPED PAINT, CRACKS. PAR. 56b(1)		7	INSPECT ELECTRICAL CONNECTIONS FOR FIRMNESS OF SEATING, PROPER CONTACT, TIGHTNESS, CORROSION, GREASE, OIL, DIRT. PAR. 56a(3)							
5	INSPECT CORDS AND CABLES FOR LOOSE TERMINALS, FRAYED, CUT OR SOURED INSULATION OR JACKETING, BROKEN CONDUCTORS. PAR. 56b(2)		8	INSPECT PLUGS FOR CHIPS, CRACKS, CORROSION, TARNISH, ROUGHNESS, BENDS. PAR. 56a(3) AND (4)							
6	TIGHTEN - LOOSE EXTERIOR SCREWS, BOLTS, FASTENINGS, MOUNTINGS.		9	OPERATE UNIT AND CHECK FOR SMOOTHNESS, UNUSUAL NOISES, SQUEAKS, VIBRATIONS, CORRECT OPERATION. PAR. 56c(9)							
10	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. PAR. 56c(15)										

DA FORM 11-250

REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 2586-92

Figure 25. DA Form 11-250.

*a. Daily.*

- (1) Inspect the unit for completeness. Check the components against the list in paragraph 7. Check the running spares against the list in paragraph 9.
- (2) Clean the outside of the components with a clean, dry cloth. Remove all dirt, dust, grease, oil, and corrosion.
- (3) Clean the plugs and the electrical connections with a clean, dry cloth. Remove all dirt, dust, oil, grease, and corrosion.
- (4) Check all the control knobs to be sure that they operate smoothly without binding or scraping. Turn each knob to

**SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT**  
PUBLIC ADDRESS, RECORDER, REPRODUCER

**INSTRUCTIONS:** See other side

EQUIPMENT NOMENCLATURE

**PUBLIC ADDRESS SET AN/TIQ-2(\*)**

EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (2) Defect corrected.  
NOTE: Strike out items not applicable.

NOTE: Strike out items not applicable.

NO.	ITEM	NO.	ITEM	
1	INSPECT UNIT FOR COMPLETENESS - MICROPHONE, HEADSET, CORDS, CABLES, ACCESSORIES, RUNNING SPARES. PAR. 56a (1)	13	SOLDER ANY BROKEN OR LOOSE SOLDERED CONNECTIONS. PAR. 56c (12)	
2	CLEAN EXTERIOR OF COMPONENTS OF DIRT, GREASE, GRIME, CORROSION, OIL. PAR. 56b (1)	14	INSPECT INTERNAL WIRING AND CABLING, WHERE ACCESSIBLE FOR LOOSE TERMINALS, FRAYED, CUT, OR GOUGED INSULATION OR JACKETING, BROKEN CONDUCTORS. PAR. 56c (12)	
3	CLEAN PLUGS AND ELECTRICAL CONNECTIONS OF CORROSION, TARNISH, DIRT, DUST, GREASE, OIL. PAR. 56b (3)	15	INSPECT MOTORS FOR CONDITION OF BRUSHES, EVIDENCES OF OVERHEATING, END PLAT, SIDE PLAT. PAR. 56c (10)	
4	INSPECT EXTERIOR OF COMPONENTS FOR RUST, CORROSION, LOOSE OR MISSING SCREWS, CHIPPED PAINT, CRACKS. PAR. 56b (1)	16	INSPECT REPRODUCER AND/OR RECORDER HEADS FOR GENERAL CONDITION. PAR. 56b (1)	
5	INSPECT CORDS AND CABLES FOR LOOSE TERMINALS, FRAYED, CUT OR GOUGED INSULATION OR JACKETING, BROKEN CONDUCTORS. PAR. 56b (3)	17	CLEAN CIRCUIT ELEMENTS, LOUD-SPEAKERS, TURNTABLES, REELS, MOTORS OF DIRT, DUST, GREASE, OIL, GRIME, WHERE ACCESSIBLE. PAR. 56b (2)	
6	TIGHTEN - LOOSE EXTERIOR SCREWS, BOLTS, FASTENINGS, MOUNTINGS. PAR. 56c (6)	18	INSPECT CAPACITORS, POTENTIOMETERS, AND RESISTORS FOR LOOSE TERMINALS, CORROSION, LEAKS, BULGES, BLISTERING, DISCOLORATION. PAR. 56c (11)	
7	INSPECT ELECTRICAL CONNECTIONS FOR FIRMNESS OF SEATING, PROPER CONTACT, TIGHTNESS, CORROSION, GREASE, OIL, DIRT. PAR. 56c (3)	19	INSPECT INKING UNITS FOR CLOGGING, GUMMY DEPOSITS, DIRT, GREASE.	
8	INSPECT PLUGS FOR CHIPS, CRACKS, CORROSION, TARNISH, ROUGHNESS, BENDS. PAR. 56c (8)	20	INSPECT ALL LABELS, ENGRAVINGS, PLATES FOR LEGIBILITY. PAR. 56c (2)	
9	OPERATE UNIT AND CHECK FOR SMOOTHNESS; UNUSUAL NOISES, SQUEAKS, VIBRATIONS; CORRECT OPERATION. PAR. 56c (10)	21	CLEAN, TIGHTEN, AND WHERE APPLICABLE, LUBRICATE AIR FILTER.	
10	INSPECT ALL VISIBLE MOVING PARTS FOR BINDING, SCRAPING, SQUEAKING, EVIDENCES OF WORN BEARINGS, SHAFTS, GEARS. PAR. 56c (10)	22	LUBRICATE UNIT IN ACCORDANCE WITH LATEST DEPARTMENT OF THE ARMY LUBRICATION ORDER OR INFORMATION PUBLISHED IN APPROPRIATE TECHNICAL MANUAL. PAR. 56c (13)	
11	INSPECT TUBE SOCKETS FOR CRACKS, CHIPS, LOOSE SOLDER CONNECTIONS. PAR. 56c (11)	23	INSPECT MOISTURE AND FUNGUS PROOFING. PAR. 56c (16)	
12	INSPECT TUBES FOR SEATING, LOOSE ENVELOPES. PAR. 56c (11)	24	INSPECT FOR PROPER SEASONAL MAINTENANCE WHERE APPLICABLE. PAR. 56c (18)	
25	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. PAR. 56c (15)		25	INSPECT CONTROLS FOR BINDING, SCRAPING, POSITIVE ACTION. PAR. 56c (10)

DA FORM 11-251

REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

TM 586-90

Figure 26. DA Form 11-251.



be sure that it turns smoothly. If there are signs of binding or scraping, notify the maintenance man.

- (5) Check all the switches for smooth, positive operation. If they do not operate smoothly or if they fail to operate, notify the maintenance man.
- (6) Inspect the control knobs for cracks. If the control knobs are cracked or broken, notify the maintenance man.

*b. Weekly.*

- (1) Inspect the outside of the equipment for rust, corrosion, loose or missing screws, chipped paint, and cracks. Use a clean, dry cloth to remove dust, dirt, and corrosion. If the equipment has loose or missing screws, chipped paint, or bad scratches, notify the maintenance man.
- (2) Inspect the cords and cables for loose terminals, frayed or cut installation, and broken conductors. Repair damaged insulation with tape. If loose terminals cannot be tightened by hand, notify the maintenance man.
- (3) Inspect the electrical connections for tightness and proper seating. Tighten by hand all connections that have a screw-type collar. *Do not force them.* On connections that are made with a plug and jack, pull the plug halfway out, and push it in again. *Do not force or twist the plug.* Any trouble should be noted on DA Form 11-250.
- (4) Check the terminals on the rear of the speaker. Be sure that the wires connecting to the speaker are clean and tight.
- (5) Inspect the control knobs for cracks. If the control knobs are cracked or broken, notify the maintenance man.

*c. Monthly.*

- (1) Inspect the PA set to be sure that all the components (par. 7) are with the equipment, and that each component is working correctly. Get replacements for all components that are missing or not working properly.
- (2) Remove all dust, dirt, oil, grease, and moisture from the outside of the PA set. If the equipment cannot be cleaned with a clean, dry cloth, use a cloth moistened with solvent (SD). Dry the equipment with a dry, lint-free cloth. Use a soft brush to remove dust and dirt from places that cannot be reached easily. Clean all panel markings and name plates.
- (3) Clean all the plugs and electrical connections. Use a clean, dry cloth for removing oil, grease, dust, dirt, tarnish, and corrosion. If the equipment cannot be cleaned with a clean, dry cloth, use a cloth moistened with solvent (SD).
- (4) Tighten all loose connections.
- (5) Tape any damaged or frayed insulation on the cords that connect the components of the PA set.

- (6) Tighten or replace all loose and missing screws. Check the catch-fasteners to see if they clamp the component securely.
- (7) Tighten all the electrical connections to be sure they are making good contact. If the prongs are tarnished or corroded, clean them with carbon tetrachloride on a clean cloth. Remove any oil, grease, or dirt from the cables.
- (8) Replace any plugs that are corroded, bent, broken, or damaged in any way that will make them unfit for use.
- (9) Operate the equipment in accordance with the instructions in the equipment performance checklist (par. 67). Listen for any unusual noises. The equipment should operate smoothly. While the equipment is operating, check for signs of overheating. Feel the equipment. If the equipment is operating with an unusual amount of vibration or heat, try to determine the cause.
- (10) Check the control knobs and the switches for any binding or scraping. Check the turntable platen when it is operating. Listen for any unusual noises in the gear box. Look for signs of overheating. Check to see if the blower is working properly.
- (11) Remove the six screws from the front of the amplifier control panel. Remove the amplifier chassis from its case. Check the tubes to see that they fit snugly in their sockets. Remove the tubes, and check to see if the tube sockets are cracked or broken. Look for loose pieces of solder. Dust the equipment by blowing off the dust, or use a clean cloth or brush. Remove any dust from the vent holes so that there will be adequate ventilation.
- (12) Turn the chassis over, and remove the plate from the bottom of the chassis by removing the eight screws that hold the plate to the chassis. Inspect the wiring for loose or broken terminals. Check to see if the wires are bared at any place. Solder all loose terminals, and tape up any bare wires. Remove loose drops of solder that may have fallen into the chassis. Do not probe the wiring in the chassis with a prod of any type; this procedure may break the wires and cause additional trouble. Replace the bottom plate. Turn the chassis over, and replace the tubes. Place the chassis in the amplifier case, and replace the screws.
- (13) Remove the four screws from the front of the turntable control panel. Remove the turntable from its case. Check the wiring on the turntable pickup arm. Repair any bare wire with tape. Turn the turntable unit over, and check the wiring under the chassis. Look for broken or bare wires. Resolder any loose connections. Repair any dam-

aged insulation with tape. Remove any excessive oil that may be on the outside cover of the gear box. Lubricate the turntable unit as directed in the lubrication instructions (par. 58). Replace the turntable chassis in its case, and tighten the screws.

- (14) Clean and dust the remainder of the equipment that comes as part of the PA set and any auxiliary equipment that may be used. Check all screws and bolts for stripped threads. See if any shafts or sections of the stands are bent. Check all electrical connections. Repair or replace parts wherever necessary.
- (15) Any fault found with the equipment that cannot be repaired when found, should be noted on DA Form 11-251 (fig. 25) and the equipment should be turned in for higher echelon repair.
- (16) When any repairs are made, check to see if the parts have had proper fungiproofing. Parts can be fungiproofed by painting them with a coat of varnish. *Do not use varnish near electrical contacts.*

### **Section III. LUBRICATION AND WEATHERPROOFING**

#### **57. General**

The PA set has five points to be lubricated once a month. Three oil cups are located on the turntable, and on Amplifier AM-20B/TIQ-2, two oil tubes are located on the blower motor.

#### **58. Turntable**

To lubricate the turntable, proceed as follows:

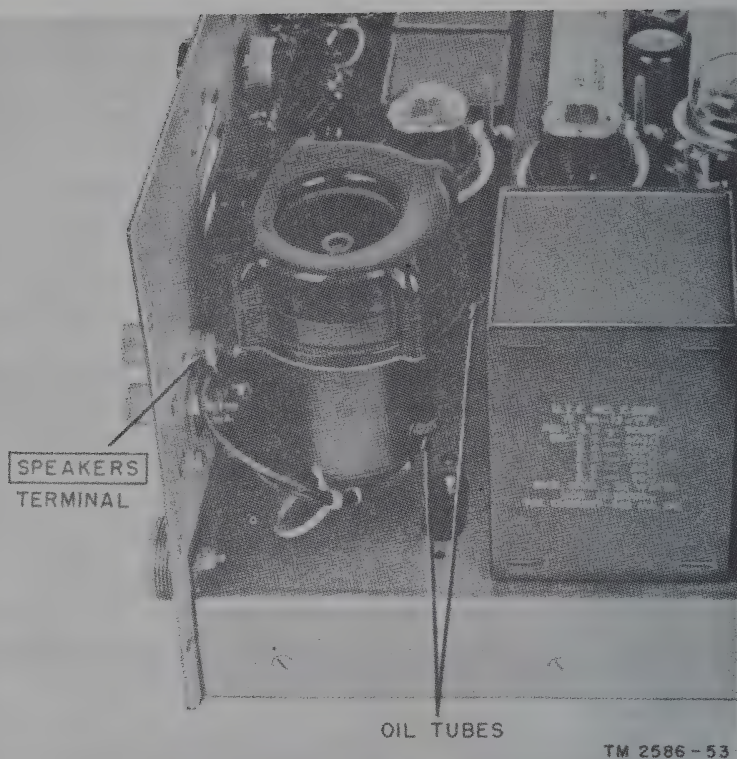
- a. Remove the turntable platen by removing the clip from the top of the turntable platen. Insert a screwdriver into the hole of the clip and slide the clip away from the center pin. Remove the clip.
- b. Remove the turntable platen by lifting it straight up.
- c. Use oil, lubricating, special, preservative (PL special). Place 2 or 3 drops in each of the oil holes (fig. 53).
- d. Replace the turntable platen.

#### **59. Amplifier**

To lubricate the amplifier blower motor, remove the amplifier from the amplifier case by following the instructions in paragraph 70c(1) through (3). Place 2 or 3 drops of oil (PL special) into each oil tube (fig. 27). Replace the chassis into the amplifier case.

#### **60. Lubrication Under Unusual Conditions**

a. *Arctic Regions.* Lubricants that are satisfactory at moderate temperatures stiffen and solidify at subzero temperatures; as a result



*Figure 27. Blower motor on Amplifier AM-20B/TIQ-2 showing oil tubes.*

moving parts bind or become inoperative. When preparing the equipment for subzero operation, see that all of the lubricants used for moderate temperatures are thoroughly removed. Even a small amount left on the equipment may impair the operation of the moving parts. When operating in arctic or cold climates refer to TB SIG 69, Lubrication of Ground Signal Equipment.

*b. Tropical Regions.* High temperature and moisture caused by rain and condensation may cause normally satisfactory lubricants to flow from moving parts and other surfaces. These bearings and moving parts will wear excessively. Hinges and catch fasteners may be damaged or destroyed by rust and corrosion. Inspect the equipment daily and lubricate it as required. Use oil, engine, heavy duty (OE-10) for lubricating the PA set in tropical climates.

*c. Desert Regions.* Dust filtering into the equipment causes grit in the lubricants and will seriously impair and damage the moving parts of the PA set. Hot, dry temperature will cause the lubricants to flow from the moving parts, and conditions similar to those described in *b* above will result. Lubricate the equipment as described for tropical regions when operating in desert areas.



## 61. Weatherproofing

a. *General.* Signal Corps equipment, when operated under severe climatic conditions such as prevail in tropical, arctic, and desert regions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

b. *Tropical Maintenance.* A special moistureproofing and fungiproofing has been devised, which, if properly applied, provides a reasonable degree of protection. This treatment is explained in TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, and TB SIG 72, Tropical Maintenance of Ground Signal Equipment.

c. *Arctic Maintenance.* Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures are explained in TB SIG 66, Winter Maintenance of Signal Equipment, and TB SIG 219, Operation of Signal Equipment at Low Temperatures.

d. *Desert Maintenance.* Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75, Desert Maintenance of Ground Signal Equipment.

## 62. Rustproofing and Painting

a. When the finish on any of the cases has been badly scarred or damaged, the cases may get wet if exposed to the weather and the layers of the plywood may separate. This can be prevented by touching up the bare surfaces. Use No. 000 sandpaper to clean and smooth the bared surface.

**Caution:** Do not use steel wool. Minute particles frequently enter the cases and cause harmful shorting or grounding of circuits.

b. When a touchup job is necessary, apply paint with a small brush. Remove dirt and corrosion from the case before applying paint. Paint used will be authorized and consistent with existing regulations.

## Section IV. TROUBLESHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

### 63. General

a. The amount of troubleshooting and repair that can be performed at organizational maintenance level is limited by—

- (1) The tools and test equipment issued.
- (2) The types of replaceable parts issued.
- (3) The tactical situation.

b. The organizational repairman can trace troubles to a component (sectionalization) and replace that component. He can replace the amplifier, turntable, microphone, speaker, and cords. He can replace



portions of the above components such as tubes, lamps, fuses, and knobs. Other repairs are done by higher echelon maintenance men.

*c.* The procedure for tracing trouble to a component is given in paragraph 64. Paragraph 66 describes how to use the equipment performance check list (par. 67).

## **64. Visual Inspection**

*a.* When failure is encountered and the cause is not apparent, check as many of the items listed in *b* and *c* below as practicable before starting a systematic operational check of the equipment. Do not, however, disassemble the PA set for a complete inspection without some knowledge of the operational symptoms. If possible, obtain information from the operator of the equipment regarding the performance of the equipment at the time of the failure.

*b.* Complete failure of the PA set may be caused by one or more of the following faults:

- (1) Damaged or improperly connected power cables.
- (2) Blown fuses.
- (3) Amplifier not operating properly.

*c.* Partial failure of the PA set may be caused by one of the following faults:

- (1) Worn, broken, or disconnected cords or plugs.
- (2) Wrong needle or needle positioned incorrectly.
- (3) Speaker wire broken or improperly connected.
- (4) PHONO LINE or RADIO C. MIC switches in the wrong position.
- (5) Microphone, phonograph, or radio connecting cables broken or improperly connected.

## **65. Testing Tubes**

*a.* Inspect all cabling, connections, and the general condition of the equipment before attempting removal of electron tubes.

*b.* Isolate the trouble, if possible, to a particular unit or section of the equipment.

*c.* If a tube tester is available, remove and test one tube at a time. Substitute new tubes only for those which are defective.

*d.* If a tube tester is not available, troubleshoot by the tube substitution method.

- (1) Replace the suspected tubes, one at a time, with new tubes. Note the sockets from which the original tubes were removed. If the equipment becomes operative, discard the last tube removed.

*Note.* Some circuits, for example oscillator circuits, may function with one tube and not another, even when both tubes are new. If practicable, retain any removed tube until its condition is checked by a suitable test instrument.

(2) Reinsert the remaining original tubes, one at a time, in the original sockets. If equipment failure occurs during this step, discard the last original tube. *Do not leave a new tube in a socket if the equipment operates satisfactorily with the original tube.*

(3) If there is an insufficient number of spare tubes, proceed as follows:

(a) Substitute a new tube for one original tube. If the equipment continues to be inoperative, replace the new tube with the original. Similarly, check each original tube, in turn, until the equipment becomes operative.

(b) It is often possible to remove a tube from one section of the equipment without affecting the section being checked. In this case, troubleshoot the defective section. Use this tube as a substitute spare.

*Note.* If a replacement for a bad tube soon becomes defective, check the adjustment and condition of component parts of the tube circuit, otherwise continued tube replacement will furnish only temporary repair and more serious troubles may result.

e. If tube substitution does not correct the trouble, *reinsert the original tubes in the original sockets.*

f. Discard tubes under the following conditions:

(1) A test in a tube tester or other instrument shows that the tube is defective.

(2) The tube defect is obvious. *For example*, the glass envelope is broken, the filament is open, or a connecting prong or lead is broken.

g. *Do not discard* tubes merely because the tubes have been used for a specified length of time. *Satisfactory operation in a circuit is the final proof of tube quality. The tube in use may work better than a new one.* It has behind it a history of satisfactory performance whereas the new tube has no reputation as an individual entity.

h. *Do not discard* tubes merely because they fall on or slightly above the minimum acceptability value when checked in a tube tester. A certain percentage of new tubes fall near the low end of the acceptability range of the tube specification and therefore start their operational life at a value fairly close to the tube tester *retention* limit. These tubes may provide satisfactory performance throughout a long period of operational life at this *near limit* value.

## 66. Use of Equipment Performance Check List

a. *General.* The equipment performance check list (par. 67) is a guide that helps to locate trouble while the equipment is operating. The list shows the items to be checked, the action or condition, the normal indications, and the corrective measures that can be taken by

the organizational repairman if the normal indications are not present. *To use this list, follow the items in numerical sequence.*

*b. Action or Condition.* For some items, the action or condition is to set switches and controls to the positions under which the item is to be checked. For other items, it is an action that must be taken to obtain the normal indications given in the normal indications column.

*c. Normal Indications.* The normal indications column lists the indications that a repairman will see and hear, when he checks the items. If the indications are not the same as those given, the repairman should perform the corrective measures given in the corrective measures column.

*d. Corrective Measures.* The corrective measures are repairs that can be made without turning in the equipment to a higher echelon repair shop. If the PA set will not operate or the trouble is not fixed after the corrective measure is taken, troubleshooting by a higher echelon repairman is necessary.

## **67. Equipment Performance Checklist**

Before proceeding with the instructions below, connect the equipment by following the instructions in paragraph 22 through 34. Test all tubes by following the instructions in paragraph 65.

# *a. Amplifier.*

Item No.	Item	Action or condition	Normal indications	Corrective measures
1	Control knobs MICROPHONE 1, MICROPHONE 2 PHONE OR LINE, AND RADIO OR CARBON MIC.	Turn all knobs to 0 (extreme left position).	Indicating pointer on the knobs will be pointing to 0.	Loosen the set screws on the side of the control knob, set the knobs over the 0 position, and tighten the set screws.
2	Tone knob-----	Turn the knob to 0-----	When the knob is set correctly, the extreme left position will center the pointer over the number 5 on the BASS side.	Turn the knobs to the extreme left position. Loosen the set screws on the side of the knob. Center the pointer over the number 5 on the BASS side. Tighten the set screws. Turn the knob to 0.
3	Power selector switch-----	Push to the 115 or 230 position. If input to the amplifier is 115 volts, push switch to 115. If input to the amplifier is 230 volts, push switch to 230.		

PREPARATORY

Item No.	Item	Action or condition	Normal indications	Corrective measures
4	Power switch (amplifier) -----	Push to ON position and wait a few minutes for tubes to warm up.	Indicator lamp should glow and a slight hum should be heard from the speakers.	<p>Change indicator lamp.</p> <p>Check fuse. If the power selector switch is in the 115 position, there should be a 2-ampere fuse in the fuse holder, on the AM-20/TIQ-2, the AM-20A/TIQ-2, and the AM-20B/TIQ-2. On AM-20B/TIQ-2 (modified), check the fuse in the fuse holder marked 2 AMP.</p> <p>If the power selector switch is in the 230 position, there should be a 1-ampere fuse in the fuse holder on the AM-20/TIQ-2, AM-20A/TIQ-2, and AM-20B/TIQ-2. On AM-20B/TIQ-2 (modified), check the fuse in the fuse holder marked 1 AMP.</p> <p>If fuse is open, change it.</p> <p>Check the speakers. If they are found to be bad, replace them.</p>

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## EQUIPMENT PERFORMANCE

5	Microphone connected to HI-IMP-MIC-1 or LOW-IMP-MIC-1.	Speak into the microphone. Keep the microphone 6 inches away from the face.	Sound should come from the speakers.	Turn control knob marked MICROPHONE 1 to the right until sound is heard. Check the cable connections. Tighten if loose. Change microphone head. Turn control knob marked MICROPHONE 2 to the right until sound is heard. Check cable connections. Tighten if loose. Change microphone.
6	Microphone connected to HI-IMP-MIC-2 or LOW-IMP-MIC-2.	Speak into the microphone. Keep the microphone 6 inches from the face.	Sound should come from the speakers.	Turn control knob marked RADIO OR CARBON MIC. to the right until sound is heard. Check the RADIO-C, MIC, switch. Operate it to the C, MIC, position. Change the microphone. Check the cable connections. Tighten if loose.
7	Microphone connected to the CARBON MICROPHONE jack.	Speak into the microphone. Keep the microphone 6 inches from the face.	Sound should come from the speakers.	Check RADIO-C, MIC, switch. Operate switch. Operate switch to RADIO position. Turn control knob marked RADIO OR CARBON MIC. to the right until sound is heard. Check the cable connections. Tighten if loose. Replace the radio.
8	RADIO jack when a radio is connected.	Turn radio set ON-----	Sound should come from the PA set speakers after the radio has had time to warm up.	

Item No.	Item	Action or condition	Normal indications	Corrective measures
9	PHONO OR LINE jack when a special telephone line is connected.	Speech is coming from the telephone line.	Sound should come from the speakers.	Check the PHONO-LINE C. switch. Operate switch to LINE. Turn control knob marked PHONO OR LINE to the LINE position. Check the cable connections. Tighten if loose. Check the telephone circuit. Repair if bad.
10	PHONO OR LINE jack when used with the turntable. (See b below for the turntable check list.)	Record is being played on the turntable.	Sound should be coming from the speakers.	Check the PHONO-LINE switch. Operate the switch to the PHONO position. Turn the control knob marked PHONO OR LINE to the right until sound is heard. Check the cable connections. Tighten if loose. Check the turntable. (b below.) If the turntable is defective, repair or replace it.

EQUIPMENT	11	MONITOR jack-----	Listen to amplifier through the headset.	Sound should be heard when any input is in use.	Check the input circuit. Turn the appropriate control knob to the right. Check the cable connections. Tighten if loose. Replace the headset.
	12	TONE control-----	Turn the TONE knob to change the tone coming from the amplifier.	The high notes of the sound should be clearer when the TONE knob is turned in the direction of the TREBLE position. The low notes of the sound should be clearer when the TONE knob is turned in the direction of the BASS position. Sound should come from the speakers.	Turn in the equipment to a higher echelon maintenance man for repair.
	13	SPEAKERS terminals-----	Speaker connected to the terminals and any input is in use.	Sound should come from the speakers.	Check the cable connections. Tighten if loose.  Check the speaker. Replace the speaker. Check the wires going to the speakers. Replace if defective.
STOP	14	Power switch-----	Push to OFF-----	Indicator lamp should go out. Hum should stop.	Turn in equipment to a higher echelon for repair.

## b. Turntable.

Item No.	Item	Action or condition	Normal indications	Corrective measures
1	POWER switch-----	Push to 115 position-----  Push to 230 position-----  Push to ON-----	On some models of MX-39/TIQ-2 and on MX-39A/TIQ-2, the turntable should turn. On the MX-39A/TIQ-2 and some models of the MX-39/TIQ-2, the turntable platen should turn. Turntable should turn-----	Turn in equipment to a higher echelon repairman to be repaired. Check and replace fuse if bad. Turn in equipment to a higher echelon for repair. Check and replace fuse if bad. Check the POWER switch to see if it is in the 115 or 230 position. Push to correct position. Check and replace the fuse if defective. Turn in equipment to a higher echelon for repair.
3	Speed selector-----	Push to position marked 78-  Push to position marked 33%.	Turntable platen should turn at 78 rpm.  Turntable platen should turn at a slower rate of speed than that shown for item 3.	Turn in equipment to a higher echelon to be repaired. Turn in equipment to a higher echelon for repair.

E T A R T

## EQUIPMENT PERFORMANCE

4	Speed control-----	Push to position marked S. Push to position marked F. Push to the left so that the position marked 33-45 faces up. Push to the right so that the position marked 78 faces up. Place on the record with needle in first groove.	Turntable should slow down slightly. Turntable should speed up slightly. A needle should be extending down from the under side of the pickup head. A needle should be extending down from the under side of the pickup head. Sound should come from the speakers.  Sound should be clear-----	Turn in equipment to a higher echelon for repair. Turn in equipment to a higher echelon for repair. Place needle in the needle holder.  Place a needle in the needle holder.  Check cable connections. Tighten if loose. Check amplifier settings, adjust if necessary. Turn in equipment to a higher echelon for repair. Check speed selector. Push to proper speed for record being played. Check turnover knob. Move to correct position for record being played. Replace bent or broken needles. Check speed control. Move control to S or F, until music is clear. Turn in equipment to a higher echelon for repair.
5	Turnover knob (part of pickup arm).			
6	Pickup head (part of pickup arm).			



Item No.	Item	Action or condition	Normal Indications	Corrective measures
7	POWER switch-----	Push to OFF-----	Turntable should stop turning.	Turn in equipment to a higher echelon for repair.
8	MOTOR switch (on equipments that have them).	Push to OFF-----	If the power switch is not in the OFF position, the turntable should stop turning.	Push the power switch to OFF.
			If the power switch is in the OFF position, no indication.	Turn in equipment to a higher echelon for repair.

STOP

## Section V. ORGANIZATIONAL REPAIR

### 68. Sectionalization

*a. General.* Sectionalization means tracing troubles to a faulty component. Troubleshooting by the organizational repairman is limited to sectionalizing the fault and replacing the components. The higher echelon repairman will repair the components. The organizational repairman should use the instructions in this section as a guide when tracing a fault to a component. If he cannot correct the fault by this procedure, he should refer the trouble to a higher echelon repairman.

*b. Wires and Cables.* Check the condition of all wires and cables to be sure that a loose connection or a broken wire is not the cause of the trouble. Use Multimeter TS-352/U to check the cords and cables for loose or broken wires. Follow the instructions below:

- (1) Prepare the multimeter for a continuity test in the following manner:
  - (a) Turn the FUNCTION switch to OHMS.
  - (b) Put one test lead in each of the two jacks marked OHMS.
  - (c) Touch the two ends together and note the movement of the needle.
  - (d) Separate the two ends.
- (2) Test the power cords for continuity by following the procedure below:
  - (a) Place the cord on a table or floor in such a position that both ends are lying next to each other.
  - (b) Put one of the test leads into one of the plug holes in the female connector.
  - (c) Touch the corresponding male contacts on the male plug, and watch the meter. If the needle moves, the circuit is complete. If the needle does not move, it may mean that the wire is broken, the test leads are not making good contact, or that the test lead is on the wrong contact. Move the test lead to the other male terminal. If the wire is good, the needle should move. Move the test leads slightly to be sure that they are making good contact.
  - (d) Repeat the same procedure (b and c above) for the other wire in the power cord. Move the test lead in the female connector to the other hole.
  - (e) Test the other power cords in the same manner.
- (3) Make this same test on the other cords. Move the test lead used on the female connector from hole to hole until all conductors have been tested. On cords with Plug PL-55 at the end, place one test lead at the very end (tip) of the plug for one conductor, and touch the brass part (sleeve) about 1 inch

from the end for the other conductor. On cords with a plug at both ends, the two tips should form one circuit, and the two sleeves should form the other.

- (4) Test the cords for shorts by placing one of the test leads in one of the holes on the female connector, and put the other test lead in each of the other holes. Any movement of the needle on the meter means that there is a short in the cable. On plugs, touch the test leads to the tip and sleeve. Test the cords for reversed connections. Use the schematic diagram to determine the correct pin connection.

- (5) Repair or replace any cords found to be faulty.

c. *Amplifier, Turntable, Speakers, and Microphones.* When all the cables are tested and found to be good, test the amplifier, turntable, speakers, and microphone to see if they are operating correctly. These components can be checked by following the instructions in the equipment performance check list (par. 67).

## 69. Location of Replaceable Parts

The organizational maintenance man replaces only four items: the fuses, lamps, tubes, and needles in the pickup arm. The chart below lists each item, gives its location, and lists a figure reference to help locate the item. Paragraph 70 through 72 explain how to replace these parts.

Part	Location	Fig. No.
Fuse (1 amp)-----	A fuse marked 1 AMP is in the lower right side of the amplifier control panel. On some amplifiers, there will be only one fuse holder. This will hold a 1-amp fuse when the power selector switch is in the 230 position.	44
	A fuse marked 1 AMP is on the front of the turntable panel, just left of the power switch.	41
Fuse (2 amp)-----	A fuse marked 2 AMP is in the lower right corner of the amplifier. On some amplifiers, there will be only one fuse holder. This will hold a 2-amp fuse when the POWER selector switch is in the 115 position.	45
Lamp (indicator)----	The lamp is located on the amplifier panel just below the caution notice.	44 or 45
Tubes-----	All the vacuum tubes are located inside the amplifier case, mounted on the amplifier chassis.	-----
Needles-----	The needles are located underneath the turntable pickup arm.	-----

## 70. Replacing Parts on Amplifier

*a. Fuses.* To replace a fuse (figs. 23 and 24) follow the instructions below:

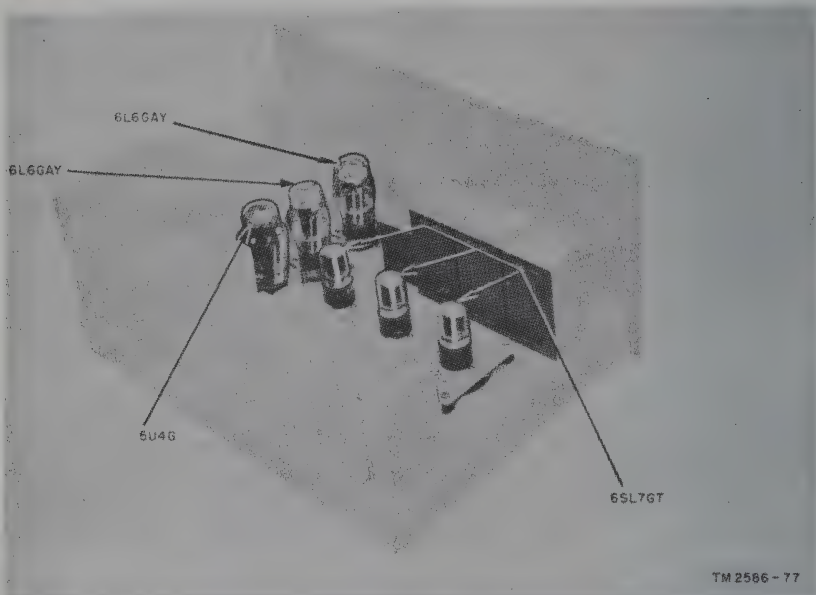
- (1) Push the power switch to OFF.
- (2) Remove the cap from the fuse holder by pushing in the cap marked FUSE and turning it to the left. Pull the cap out.
- (3) Remove the fuse from the fuse holder.
- (4) Place the new fuse in the fuse holder. Be sure that the fuse has the same value as the fuse that has been taken out, unless the purpose of the change is to put in a fuse of larger or smaller amperage.
- (5) Replace the fuse cap. The two prongs that extend from the metal part of the fuse cap should line up with the two slots in the fuse holder and the end of the fuse should be inside the metal part of the fuse cap. Push the fuse cap in, and turn it to the right until it will not turn any more without forcing.
- (6) If desired, the power switch can be pushed to the ON position.

*b. Lamp.* To replace the indicator lamp (figs. 23 and 24), follow the instructions below.

- (1) Turn the lamp cap to the left until it is free.
- (2) Push the lamp in and turn it to the left.
- (3) Remove the lamp from the lamp holder.
- (4) Place the new lamp in the lamp holder. The two prongs that extend from the lamp base should line up with the two slots in the metal part of the lamp holder.
- (5) Push the lamp in and turn it to the right until it will not turn any more without forcing.
- (6) Place the lamp cap on the lamp holder, and turn it to the right. Do not force the lamp cap if it does not go on easily. Do not strip the threads. When the lamp cap is completely threaded on the lamp holder, it will not turn any more.

*c. Tubes.* To replace the tubes (par. 65), follow the instructions below.

- (1) Disconnect all cables from the amplifier.
- (2) Remove the six screws (three on each side) from the front of the amplifier control panel.
- (3) Remove the amplifier chassis from its case.
- (4) Remove the tube clamps, and remove the tubes from the amplifier chassis (fig. 28).
  - (a) Hold the tube firmly.
  - (b) Pull up on the tube and, at the same time, gently rock the tube from side to side. Do not bend the pins on the tube.



**Figure 28.** *Amplifier chassis, rear view, showing tube layout.*

- (5) Place the new tube in the tube socket. Line up the pins of the tube with the holes in the tube socket. The guide pin on the tube will only fit in one position. Do not force the tube into the socket. Replace the tube clamps.
- (6) Replace the amplifier chassis in the amplifier case.
- (7) Replace the six screws on the amplifier control panel. Let each screw be threaded slightly before tightening any of the screws.
- (8) Tighten the screws. Do not force the screw. This may strip the threads, and cause trouble.
- (9) Connect the cables to the amplifier.

## **71. Replacing Parts in Turntable**

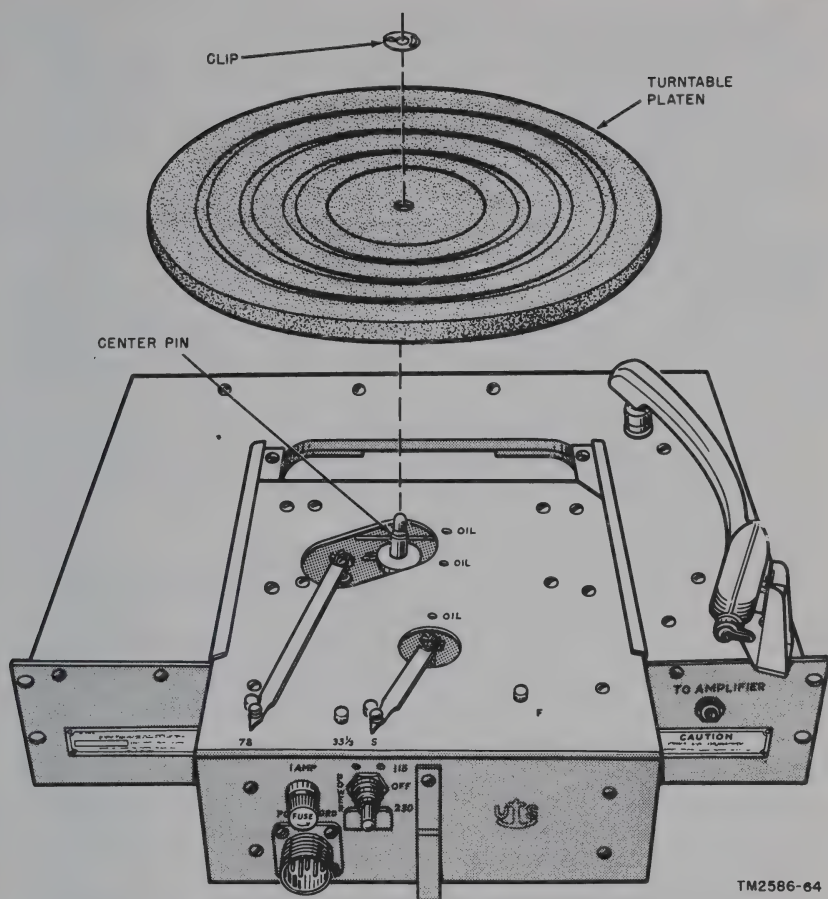
(figs. 21 and 22)

*a. Fuses.* To replace a fuse in the turntable, follow the procedure outlined in paragraph 53a.

*b. Needles.* To replace the needle in the turntable pickup arm, proceed as outlined below. Be careful not to damage the pickup arm or the new needle.

- (1) Push the POWER switch to OFF.
- (2) Place the turnover knob so that it indicates the speed of the needle to be changed.
- (3) Lift the pickup arm so that it will be in a position that will expose the needles.





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Figure 29. Turntable chassis, platen, and clip, extended view.

- (4) Place the tip of Knife TL-29 under the needle.
- (5) Pry the needle out.
- (6) Aline the thick end of the new needle with the needle hole in the pickup arm.
- (7) Insert the new needle into the hole. Be careful not to bend or damage the needle.
- (8) Turn the turnover knob to the other position if it is necessary to change the other needle, and proceed as instructed in (4) through (7) above.
- (9) Lower the pickup arm and set it on the pickup arm rest.

c. *Turntable Platen* (fig. 29). To remove the turntable platen, proceed as follows:

- (1) Remove the clip that holds the turntable platen to the center pin by placing a screwdriver into the slot in the clip, and sliding the clip from the slot in the center pin.

- (2) Lift the platen from the center pin.
- (3) Oil the turntable unit or exchange the platen with a new platen.
- (4) Place the platen over the center pin, so that the pin sticks up through the hole in the center of the platen.
- (5) Replace the clip in the slot on the center pin. Slide the clip into the slot until the pin is centered in the hole in the clip.

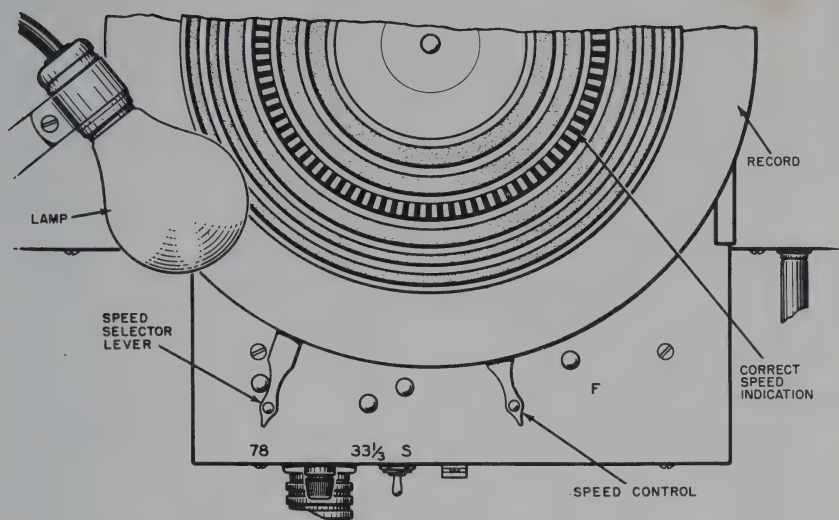
## 72. Replacing Cords

*a. Badly Damaged Cords.* The cables and cords of the PA set should be replaced when minor repairs can no longer make them serviceable. Conditions listed below indicate the need for replacement:

- (1) Cables that have been stretched to such an extent that the conductors inside the cable are broken in one or more places.
- (2) Cables that have been repaired often, and have become too short.
- (3) Cables that have badly damaged insulation.

*b. Slightly Damaged Cords.* A cord that has minor breaks or damaged insulation can be repaired. Normally, the cords will become damaged at the plugs. This is caused by pulling on the cord instead of the plug when disconnecting. Tape all damaged insulation. Splice and tape all broken conductors. Be sure that the splices are staggered at least 2 inches apart. Reconnect the plugs by following the instructions below.

- (1) Remove the cardboard cover from the face of the plugs by placing a screwdriver under one side and lifting the cardboard over the two pins.
- (2) Unscrew the two screws on the plug and disconnect the wire.
- (3) Unscrew the screw that is located on the clamp on the back of the plug.
- (4) Pull out the old cord.
- (5) Cut a few inches from the end of the cord.
- (6) Strip 2 inches of the heavy rubber cover off the end of the cord, and cut away all the paper and fiber cushioning until the two insulated conductors remain.
- (7) Clean off one-half inch of the insulation from one end of each conductor.
- (8) Put the two conductors through the hole in the plug from the rear. Pull the conductors from the front of the plug until the heavy rubber cover is inside the clamp on the rear of the plug and into the end of the plug as far as it will go.
- (9) Tighten the screw on the rear of the plug until the cable is held firmly by the clamp.
- (10) Wrap the bared end of one of the conductors around one of the screws on the front of the plug, and tighten the screw



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Figure 30. Testing speed of turntable platen.

until the wire is held firm. Place the other wire under the other screw, and tighten the screw.

- (11) Inspect the plug to be sure that the wire ends are not shorted to each other or to the plug shell.
- (12) Replace the cardboard insulator.

### 73. Checking Speed of Turntable

The speed of the turntable can be checked with the use of a stroboscope card and a neon or fluorescent lamp. The frequency of the power for the following explanation is 60 cycles per second (cps).

- a. Connect the turntable to the power line (par. 24).
- b. Turn on the power.
- c. Place a stroboscope card over the center pin of the turntable platen.
- d. Place the speed selector lever in the 78 position.
- e. Locate the ring on the stroboscope card that indicates the 78.25 rpm at 60 cycles.
- f. Place a lamp close to the turntable platen (fig. 30), approximately 2 feet away.
- g. Turn the turntable motor on.
- h. When the turntable is turning at 78 rpm, the ring that is designated for 78 rpm at 60 cycles will appear to be stopped (fig. 30). If it does not appear to be stopped, adjust the speed control lever until it does. All other rings will be blurred.

*Note.* When the speed of the platen is too fast, the dots will appear to rotate in the same direction as the platen; when the speed is too slow the dots will appear to rotate in the opposite direction.

## CHAPTER 5

### THEORY

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#### Section I. ELECTRICAL THEORY OF OPERATION

#### 74. General

*a.* The PA set provides for various input circuits. The input circuits may be of a high or low impedance and may come from microphones, telephones, or from a turntable. Several of these inputs may be used at the same time.

*b.* Paragraphs 75 through 80 describe the input circuits, the amplifier circuits, the phase inverter circuit, the output circuit, and the power supply circuits. Differences in models will be described throughout the theory sections where the differences appear.

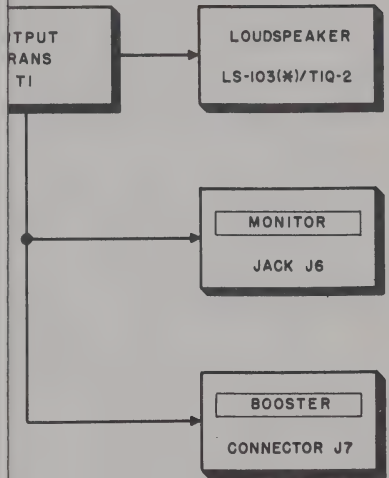
*c.* For the purpose of clarity, partial schematics are used in the theory discussion. The entire circuit schematic (figs. 62, 63, and 64) should be referred to for locating the position of the partial schematics in the overall circuit. When possible, the partial schematics will be discussed in the order in which they appear on the overall schematic.

*d.* The block diagram in figure 31 shows the various circuit stages and the positions they occupy in the amplifier.

#### 75. Input Circuits

*a.* HI-IMP-MIC-1 and LOW-IMP-MIC-1 have a circuit identical with the circuit for HI-IMP-MIC-2 and LOW-IMP-MIC-2. This explanation will cover the HI-IMP-MIC-1 and LOW-IMP-MIC-1 and their components. For explanation of the HI-IMP-MIC-2 and LOW-IMP-MIC-2, substitute the equivalent components for those given in the explanation below.

- (1) *HI-IMP-MIC-1* (fig. 32). A signal voltage developed by a high-impedance microphone connected to connector P1 will develop a signal across resistor R1, and this signal is applied to the control grid (pin 1) of tube V1A. For the explanation of the action that takes place from this point on, refer to the circuit described in (3) below.
- (2) *LOW-IMP-MIC-1* (fig. 32). A signal voltage developed by a low-impedance microphone connected to connector J1 will develop a signal that is impressed across the primary (1-2 winding) of transformer T3. This signal induces a





## CHAPTER 5

### THEORY

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#### Section I. ELECTRICAL THEORY OF OPERATION

#### 74. General

*a.* The PA set provides for various input circuits. The input circuits may be of a high or low impedance and may come from microphones, telephones, or from a turntable. Several of these inputs may be used at the same time.

*b.* Paragraphs 75 through 80 describe the input circuits, the amplifier circuits, the phase inverter circuit, the output circuit, and the power supply circuits. Differences in models will be described throughout the theory sections where the differences appear.

*c.* For the purpose of clarity, partial schematics are used in the theory discussion. The entire circuit schematic (figs. 62, 63, and 64) should be referred to for locating the position of the partial schematics in the overall circuit. When possible, the partial schematics will be discussed in the order in which they appear on the overall schematic.

*d.* The block diagram in figure 31 shows the various circuit stages and the positions they occupy in the amplifier.

#### 75. Input Circuits

*a.* HI-IMP-MIC-1 and LOW-IMP-MIC-1 have a circuit identical with the circuit for HI-IMP-MIC-2 and LOW-IMP-MIC-2. This explanation will cover the HI-IMP-MIC-1 and LOW-IMP-MIC-1 and their components. For explanation of the HI-IMP-MIC-2 and LOW-IMP-MIC-2, substitute the equivalent components for those given in the explanation below.

- (1) *HI-IMP-MIC-1* (fig. 32). A signal voltage developed by a high-impedance microphone connected to connector P1 will develop a signal across resistor R1, and this signal is applied to the control grid (pin 1) of tube V1A. For the explanation of the action that takes place from this point on, refer to the circuit described in (3) below.
- (2) *LOW-IMP-MIC-1* (fig. 32). A signal voltage developed by a low-impedance microphone connected to connector J1 will develop a signal that is impressed across the primary (1-2 winding) of transformer T3. This signal induces a

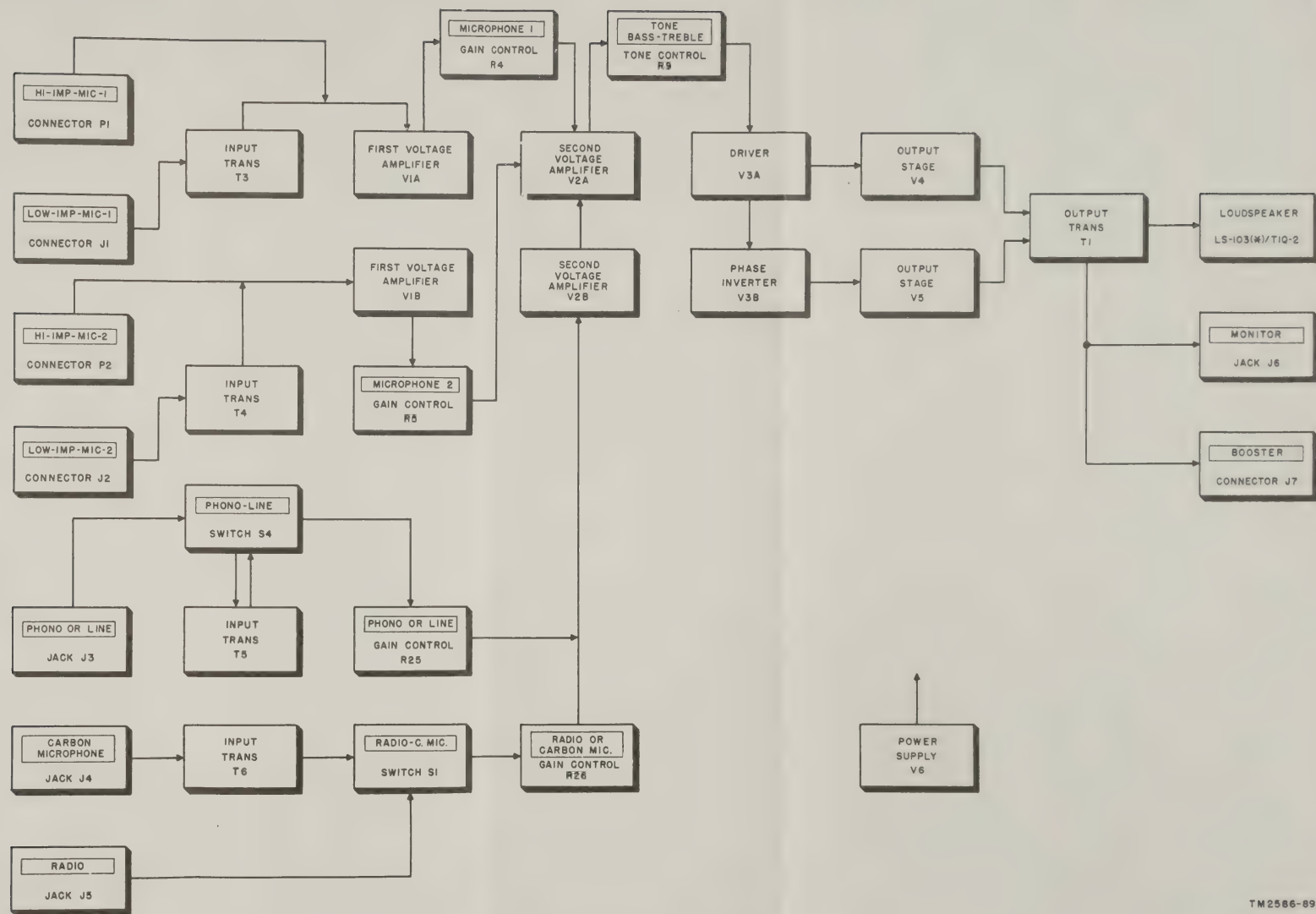
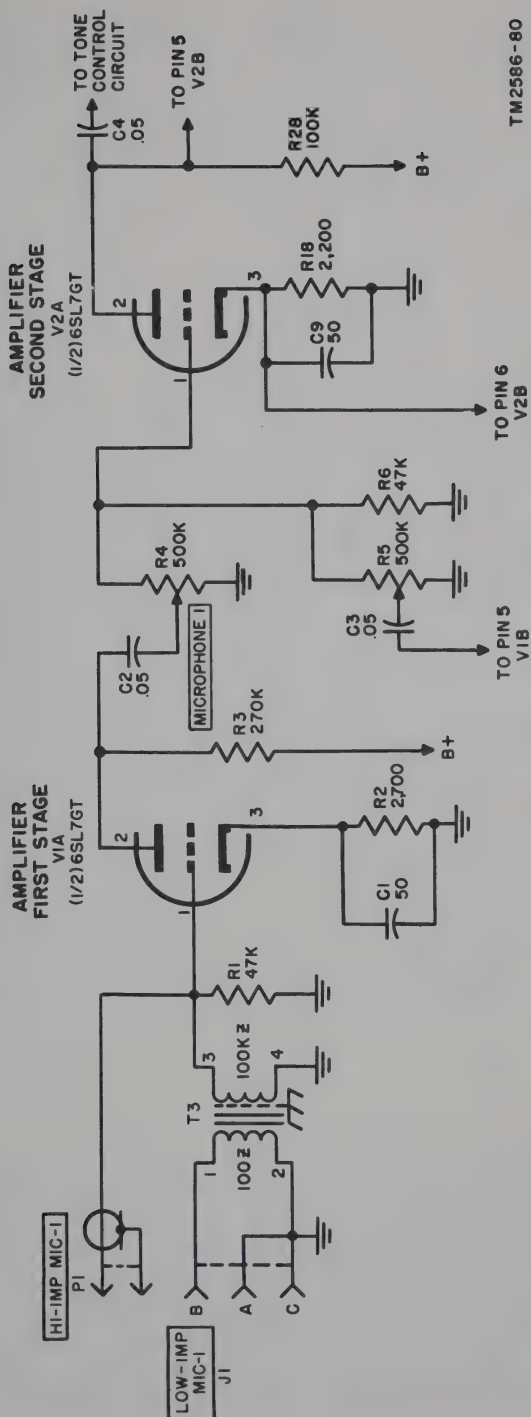


Figure 31. Amplifier AM-20(\*)/TIQ-2, block diagram.





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Figure 32. Input circuit for a high-impedance microphone and a low-impedance microphone.

voltage into the secondary (3-4 winding) of T3. The induced signal voltage is applied to resistor R1 and on the control grid (pin 1) of tube V1A. Resistor R2 is a cathode bias resistor, capacitor C1 is the cathode bypass capacitor, and resistor R3 is the plate load resistor for tube V1A.

- (3) *First amplifier.* As the voltage applied to the control grid (pin 1) of V1A changes, the amount of electrons that flow through V1A changes. This change in electron flow in the tube changes the electron flow through the plate circuit, and thus causes a change in the voltage drop across plate load resistor R3. This change in the voltage drop will affect the applied voltage to coupling capacitor C2. Signals applied to capacitor C2 will develop a signal across all or part of potentiometer R4 (MICROPHONE 1). This signal is applied to grid lead resistor R6 and to the control grid (pin 1) of tube V2A. Signals from HI-IMP-MIC-2 and LOW-IMP-MIC-2 are applied through tube V1B, capacitor C3, and potentiometer R5 (MICROPHONE 2). Resistor R18 is the cathode bias resistor for tube V2A and V2B. Capacitor C9 is the cathode bypass capacitor for resistor R18. Resistor R28 is the plate load resistor for tube V2. Changes in voltages on pin 1 of V2A will cause a change in the voltage applied to capacitor C4. For the remainder of this circuit, refer to the tone control circuit (par. 77).

b. The signals applied to the PHONO OR LINE jack J3 (fig. 33) may come from a high-impedance turntable circuit or from a low-impedance line circuit. For impedance matching, the PHONO-LINE switch S4 must be operated to the correct position. When switch S4 is in the PHONO position, a circuit is completed for signals from the turntable pickup through jack J3 to PHONO OR LINE potentiometer R25. When switch S4 is in the LINE position, a circuit is connected from a low-impedance line circuit through connector J3 to the primary (1-2 winding) of transformer T5. Voltage induced from the primary to the secondary (3-4 winding) of transformer T5 are extended to potentiometer R25. Signals developed on potentiometer R25 are applied to the control grid (pin 4) of the tube V2B. For further information, refer to *e* below.

c. When a carbon microphone is to be used, the microphone cord must be plugged into the CARBON MIC. jack J4 (figs. 34 and 35). The RADIO-C.MIC. switch S1 must be operated to the C.MIC. position. Dc must be provided to the carbon microphone. This is accomplished through voltage dropping resistor R33 and dc from the power supply. Refer to paragraph 79 for an explanation of the power supply. The dc voltage that is applied to the carbon microphone is also applied to capacitor C13. When a sound wave strikes



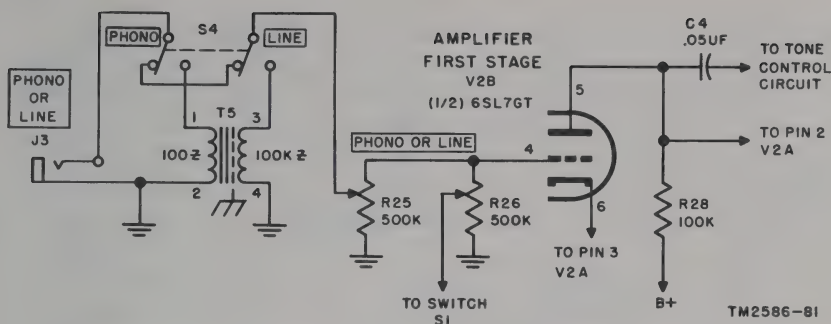


Figure 33. Input circuit for PHONO OR LINE jack.

the diaphragm in the carbon microphone, the carbon granules change their resistance. The change in resistance will change the current in the circuit, which changes the voltage applied to capacitor C13. This change causes the capacitor to charge or discharge through the primary of transformer T6, and thus a voltage is induced in the secondary of T6. The voltage at T6 secondary will be applied through all or part of potentiometer R26, and to the control grid (pin 4) of tube V2B. For further information, refer to *e* below.

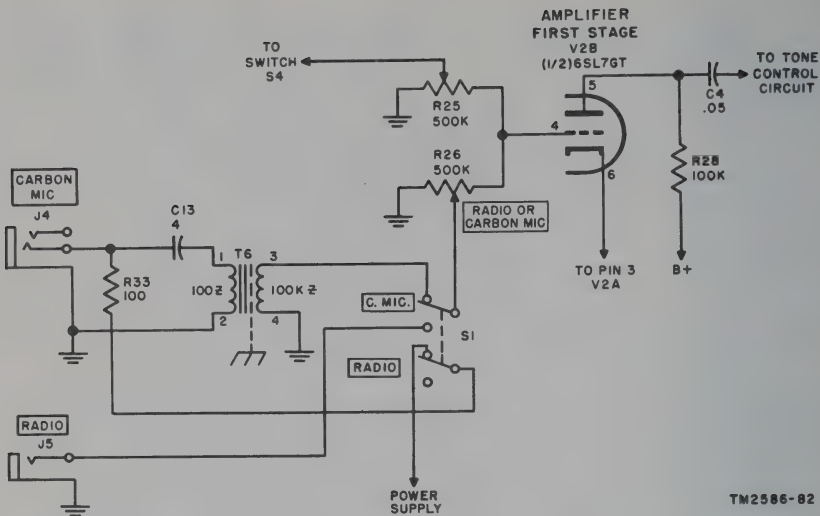
*d.* When a radio is to be used as an input source, the output of the radio must be connected to RADIO jack J5 (fig. 23). RADIO-C.-MIC. switch S1 must be in the RADIO position. On Amplifier AM-20B/TIQ-2 (modified) only (fig. 35), the RADIO-C.MIC. switch disconnects dc from the CARBON MIC. jack J4 and transfers the signal circuit to potentiometer R26. On all other models of the amplifier, the RADIO-C.MIC. switch (fig. 34) will only transfer the signal circuit. Signals from the radio will be applied directly to potentiometer R26, and to the control grid (pin 4) of tube V2B.

*e.* Signals applied to the control grid of the V2B change the electron flow through this section of the tube. This change in electron flow causes a difference in voltage drop across plate load resistor R28, and changes the voltage applied to coupling capacitor C4.

## 76. Tone Control

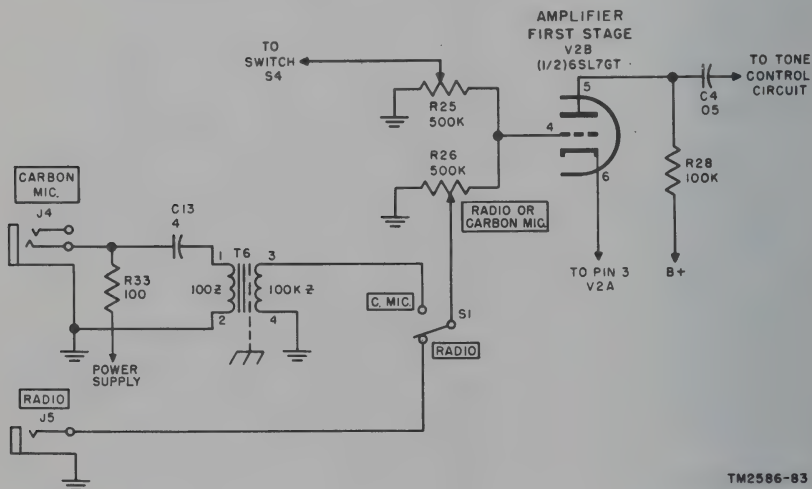
(fig. 36)

Signals applied through capacitor C4 develop a voltage across the tone control network (resistors R7, R8, and R10; capacitors C5, C6, and C7; and potentiometer R9) and impress the resultant voltage on the control grid (pin 1) of tube V3A. This resistance and capacitance network will react differently to high and low frequencies, depending on the position of the slide contact of potentiometer R9. When the slide contact of the potentiometer is in the center, all frequencies are attenuated equally. This permits a normal tone to pass through the final stages of the amplifier.



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Figure 34. Input circuit for CARBON MIC. and RADIO jacks, on Amplifier AM-20/TIQ-2 AM-20A/TIQ-2, and AM-20B/TIQ-2.



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Figure 35. Input circuit for CARBON MIC. and RADIO jacks, on Amplifier AM-20B/TIQ-2 (modified)

a. When the slide contact of potentiometer R9 is moved toward the grounded terminal (TREBLE position), capacitor C5 is shunted. This permits a parallel path for all frequencies to flow. One circuit consists of resistor R8 and part of potentiometer R9 if there is any resistance; the other circuit consists of resistor R7, capacitor C6, resistor R10, and capacitor C7. The value of the capacitors in the

second path will restrict the flow of low frequencies. This causes the low frequencies to be shunted to ground through resistor R8. The higher frequencies find a path through the latter circuit (R7, C6, R10, C7), even though they are largely shunted to ground by resistor R8. The small amount of the signal that flows through the latter circuit, will be enough to develop a signal on the control grid (pin 1) of tube V3A. This allows the high frequencies to be amplified and the low frequencies to be shunted.

b. When the slide contact of potentiometer R9 is moved toward the terminal connected to the control grid (pin 1) of V3A (BASS position), capacitor C5 is placed in the circuit. Low frequencies find a path through resistor R8 and a parallel path of capacitor C5, potentiometer R9, and resistor R10 in series with capacitor C7. The low frequencies develop a signal on the control grid (pin 1) of tube V3A. High frequencies find a low-impedance path through resistor R8 and capacitor C5. This allows the low frequencies to be amplified, and the high frequencies to be shunted out.

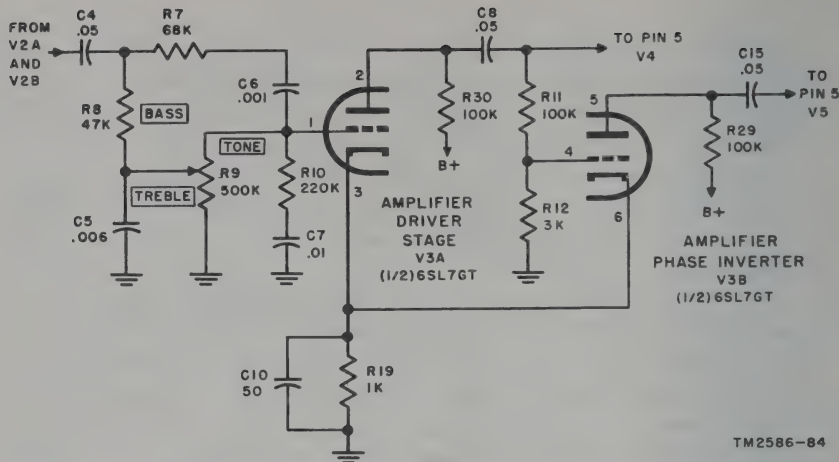
c. Varying the position of the slide contact of potentiometer R9 will vary the range of frequencies that will pass through tube V3A and the final stages.

## **77. Driver and Phase Inverter**

(fig. 36)

a. All signals that pass through the tone control circuit and are impressed on the control grid (pin 1) of tube V3A are amplified by tube V3A. Resistor R19 is the cathode bias resistor for tubes V3A and V3B. Capacitor C10 is the cathode bypass capacitor for resistor R19. Resistor R30 is the plate load for tube V3A. Capacitor C8 is a coupling capacitor between driver tube V3A and the output stage of the amplifier. Signals applied through capacitor C8 will develop a voltage across resistor R11 and R12. This voltage is applied to the control grid (pin 5) of tube V4, which is one-half of a push-pull output circuit.

b. Resistors R11 and R12 make up a voltage divider circuit. A portion of the signal that is impressed on the control grid of tube V4 is used to drive tube V3B. The function of tube V3B is to invert and amplify this signal and feed tube V5 with the same signal that is being fed to tube V4. This signal will be 180° out of phase with the signal on tube V4 control grid. Resistor R29 is the plate load resistor for tube V3B. Capacitor C15 is a coupling capacitor between tube V3B and tube V5. Resistor R31 is a grid leak resistor for tube V5. Signals amplified by tube V3B will be impressed on capacitor C15. These signals will develop a voltage on resistor R31, and on the control grid (pin 5) of tube V5, which is the other half of the push-pull output circuit.



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Figure 36. Tone control, driver, and phase inverter circuits.

## 78. Output Circuit (fig. 37)

a. Tubes V4 and V5 are beam-power amplifiers, biased class B. The signals applied to the controls grids of each tube are  $180^\circ$  out of phase. The primary of transformer T1 is the plate load for tube V4 and V5. Resistors R13 and R32 provide a voltage divider circuit for applying B+ to the screen grids of tubes V4 and V5. Resistor R20 is the cathode bias resistor for both tubes. Capacitor C11 is the bypass capacitor for resistor R20.

b. When the signal on the control grid of tube V4 goes positive, a similar signal is applied to the control grid of tube V5. The signal on tube V5, however, goes negative. This allows tube V4 to amplify its signal, and tube V5 to be driven to cutoff. When the input signals reverse polarity, tube V4 is driven to cutoff, and tube V5 amplifies its signal. The result is half wave amplifications from each tube alternately (fig. 37). These signals will flow from the plate of tubes V4 to B+, from V5 to B+, and then from V4. The change in current flows through half of the plate load at one time and then through the other half of the plate load at the next time, both in opposite directions, will induce a clear signal voltage into the secondary of transformer T1. The voltage of the secondary is extended to the SPEAKERS terminals and to the speakers connected to those terminals.

c. The secondary of transformer T1 is tapped for impedance matching. On Amplifier AM-20/TIQ-2, the taps are 30, 60, 125, and 250 ohms. On the AM-20A/TIQ-2, AM-20B/TIQ-2, and AM-20B/TIQ-2 (modified), an additional 600-ohm tap is provided.



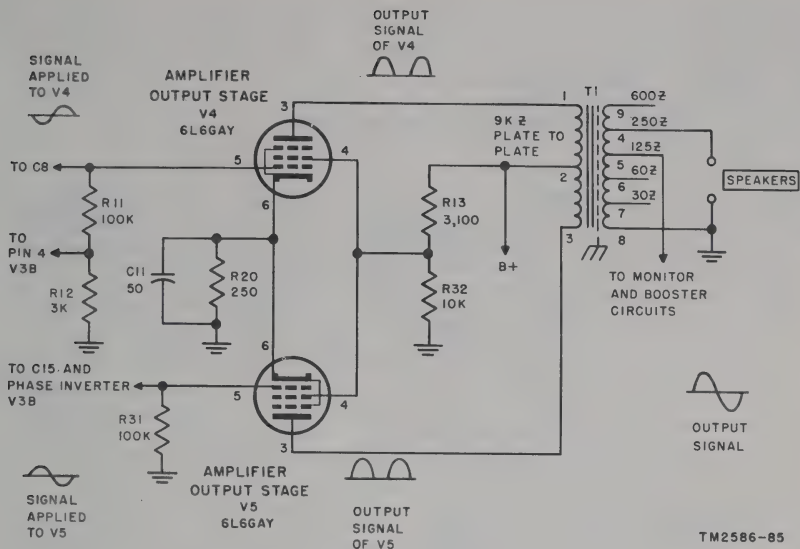


Figure 37. Output stage circuit.

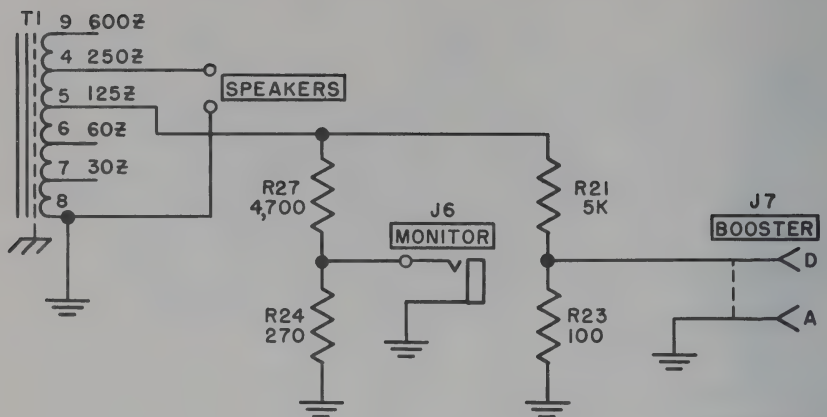
Connected to the 125-ohm tap on all models is a circuit that provides for the MONITOR jack and the BOOSTER amplifier connector.

d. Signals induced into the secondary of transformer T1 will develop a voltage across the voltage divider circuit consisting of resistor R27 and R24. The MONITOR jack is connected between ground and the voltage divider (fig. 38). The voltages that are developed across resistor R24 will be extended to the tip of the monitor jack. When a headset plug is inserted into the jack, a portion of the output will be heard in the headset.

e. Connected in parallel with resistors R27 and R24 is a voltage divider for the BOOSTER circuit (fig. 38). This circuit consists of resistors R21 and R23. The output signal voltage will develop a signal across these two resistors. The signal developed across resistor R23 is applied to pin D of the BOOSTER connector. Pin A is connected to ground. When a booster amplifier is used, resistor R23 matches the input circuit of the LINE jack (100 ohms).

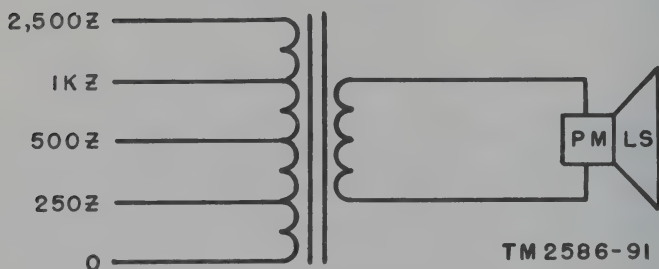
f. One or more speakers are connected to the SPEAKERS terminals by a wire. The signal applied to the SPEAKERS terminals on the amplifier is extended to the primary winding of the speaker transformer. A voltage is induced from primary winding 0 and one of the other terminals (depending on the number of speakers being used) to the secondary winding of the transformer (fig. 39). The voltage at the secondary winding develops a current flow through the voice coil of the speaker. The speaker diaphragm vibrates in response to the signal and causes the air around the diaphragm to





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Figure 38. MONITOR and BOOSTER circuit.



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Figure 39. Loudspeaker LS-103 (\*)/TIQ-2, schematic diagram.

move and create a sound wave, which is transmitted through the speaker horn and into the air.

## 79. Amplifier Power Supply

*a. Input Circuit* (fig. 40). The amplifier may operate from a 115-volt source, or a 230-volt source. On the AM-20B/TIQ-2 (modified), there is a 1-ampere fuse for 230-volt operation, and a 2-ampere fuse for a 115-volt operation. On the AM-20/TIQ-2, AM-20A/TIQ-2, and AM-20B/TIQ-2, there is only one fuse holder. The fuse in the fuse holder must be changed when the power source is changed. Use a 1-ampere fuse for 230-volt operation and a 2-ampere fuse for 115-volt operation.

- (1) *115-volt operation.* When 115 volts is the source of power, switch S1 should be in the 115 position. This places both windings of the primary transformer T2 in parallel. When switch S3 is operated to its ON position, a circuit is complete as follows: Current flows from one terminal of the ac source, through the power cord, into pin D of the

power cord connector; from pin D, the circuit continues to the first junction point and then it divides as follows:

- (a) One circuit is through the 4-3 primary winding, one contact of S1, one contact of S3, fuse F1 to contact C of the power cord connector, and to the other terminal of the power source.
  - (b) The other circuit is from the first junction point past pin D, through one contact of switch S1, the 2-1 primary winding of transformer T2, one contact of switch S3, fuse F1, to pin C of the power cord connector, and through the power cord to the other terminal of the power source.
- (2) *230-volt operation.* When switch S1 is in the 230 position, the two windings of the primary of transformer T2 are in series. When switch S3 is operated to its ON position, a circuit is completed as follows: Current flows from the ac source through one conductor of the power cord to pin D of the power cord connector. From pin D, the current flows through the 4-3 winding of the primary of the transformer, through one contact of switch S1 through fuse F2 (on AM-20B/TIQ-2 (modified) only) through the other contact of switch S1 through the 2-1 winding of the primary, one contact of switch S3, the fuse F1, through pin C of the power cord connector, through the other conductor of the power cord, to the other contact of the power source.

b. *Blower* (fig. 40). Blower motor B1 is connected in parallel with the 1-2 winding of the power transformer. When power is connected to the 1-2 winding of the transformer, power is also connected to blower motor B1. On Amplifier AM-20/TIQ-2 and AM-20A/TIQ-2, the blower motor has a starting winding through capacitor C22 and the red lead, through the motor winding to the yellow lead (fig. 63).

c. *Output Circuit* (fig. 41). The secondary of transformer T2 has three windings: 7-8, a 6.3-volt filament winding; 5-9, a 5-volt filament winding; and 10-12, a 410-volt winding center tapped at terminal 11. On AM-20/TIQ-2 and on some of the AM-20A/TIQs, the 10-12 winding is a 365-volt winding. Winding 7-8 provides filament voltage for tubes V1, V2, V3, V4, and V5. The 5-9 winding provides filament voltage for rectifier tube V6. The 10-12 winding provides plate voltage for tube V6.

- (1) *Filaments.* The filament for tube V6 is connected directly across winding 5-9. Tubes V1 through V5 receive their voltage from the following circuit: From ground connected to terminal 7 of winding 7-8, through the winding to pin A on the power cord connector. Through the jumper in the connector to pin G, through one contact of switch S3, to all the tube filaments in parallel, to ground.





capacitor C19 is used as a decoupling capacitor. On Amplifier AM-20B/TIQ-2 and AM-20B/TIQ-2 (modified) capacitor C19 is not used.

- (4) *Dc for carbon microphone* (fig. 41). Current that flows through resistor R34 from the center tap of the high voltage winding will develop a voltage of approximately 25 volts. This voltage will be filtered by capacitor C20, coil L1, and capacitor C21. The voltage is applied through resistor R33 to the carbon microphone. The voltage drop across all components of the circuit will provide the carbon microphone with approximately 3 volts.

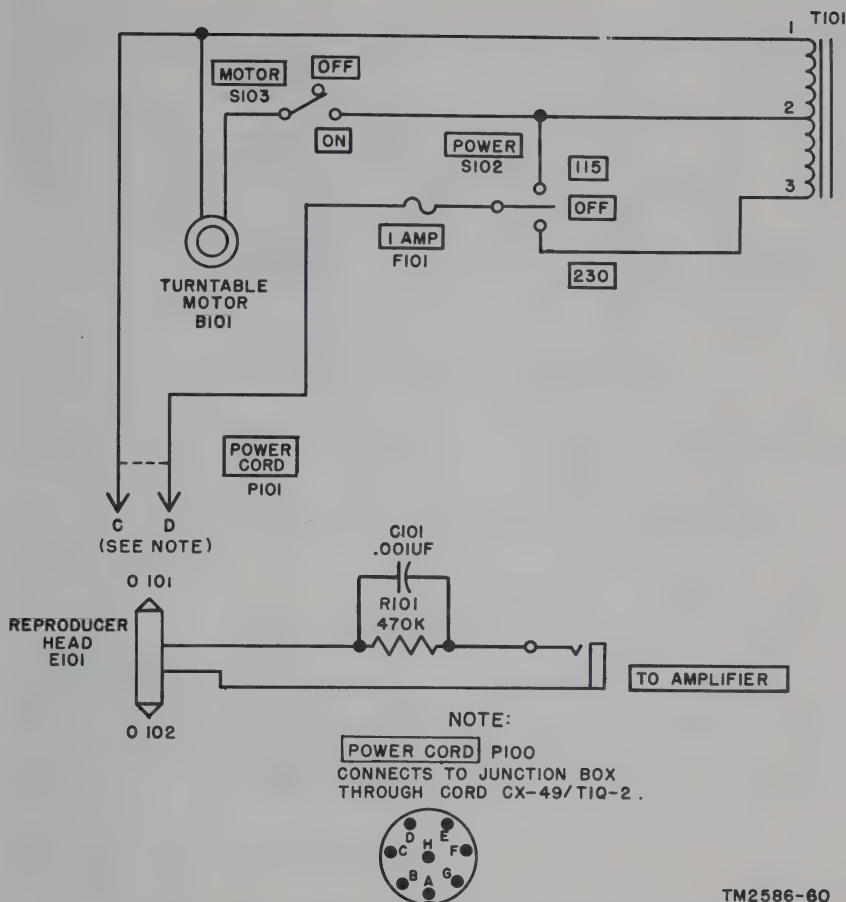
## 80. Turntable Power Supply

The turntable will operate on 115 or 230 volts. When operating from 115 volts, switch S102 must be in the 115 position. When operating on 230 volts, switch S102 must be in the 230 position. Turntable MX-39/TIQ-2 has a MOTOR switch. The circuit for the MX-39/TIQ-2 is different from that of the MX-39A/TIQ-2.

*a. Turntable MX-39/TIQ-2* (fig. 42).

- (1) *115-volt operation.* When POWER switch S102 is operated to the 115 position, and the MOTOR switch S103, is operated to the ON position, a circuit from the power source is completed as follows: From one terminal of the power source through one conductor of the power cord, to terminal D of the POWER CORD connector. From terminal D, through fuse F101, through the 115 contact of the POWER switch, through a parallel circuit consisting of the MOTOR switch and the turn table motor, and one winding of autotransformer T101, to pin C of the POWER CORD connector. From pin C, the circuit is extended through the other conductor of the power cord to the power source.
- (2) *230-volt operation.* When POWER switch S102 is in the 230 position, and the MOTOR switch S103, is in the ON position, a circuit is completed as follows: From one terminal of the power source, through one conductor of the power cord, to pin D of the POWER CORD connector. From pin D of the POWER CORD connector, through fuse F101, through the 230 position of the POWER switch, through one winding of the autotransformer to the center tap. The current now flows through a parallel path of the MOTOR switch and the turntable motor, and the other winding of the autotransformer to pin C of the POWER CORD connector. From pin C, the current flows through the other conductor of the power cord to the power source.





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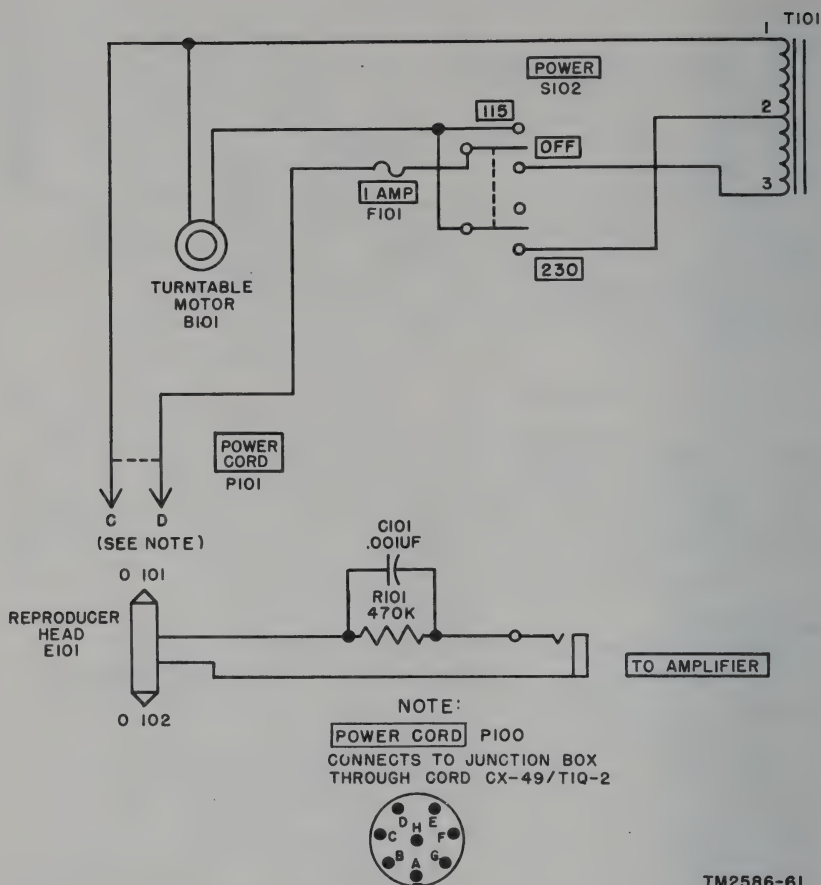
Figure 42. Turntable MX-39/TIQ-2, power supply.

b. Turntable MX-39A/TIQ-2 (fig. 43). The MX-39A/TIQ-2 does not have a MOTOR switch. The power circuit is very similar to that of the MX-39/TIQ-2 described above. When POWER switch S102, is in the 115 position, the circuit is completed from pin D through fuse F101, through the POWER switch, through the motor to pin C. When the POWER switch is in the 230 position, the circuit goes through the fuse, through one winding of the autotransformer, through a parallel path of the turntable motor and the other winding of the autotransformer, to pin C.

## 81. Pickup Circuit

(figs. 42 and 43)

The reproducer head (pickup head) consists of a crystal activated by two needles. The needles are used for standard or microgroove



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Figure 43. Turntable MX-39A/TIQ-2, power supply.

records. The vibration of the needles as they ride in the grooves of a record causes the crystal to fluctuate and generate a voltage. The higher the frequency, the higher the voltage that the crystal generates. To equalize the output voltage, a compensating network consisting of a .001- $\mu$ f capacitor connected in parallel with a 470K resistor is connected in the circuit. On some models of the MX-39A/TIQ-2, the resistor is 510K. This network will attenuate the higher frequencies more than the lower frequencies. This allows the signals to be approximately equal amplitude when impressed on the control grid of tube V2.

## Section II. MECHANICAL THEORY OF OPERATION

### 82. General

The turntable motor is mounted in a position which allows the motor shaft to extend through the gear box. When the motor turns, a worm

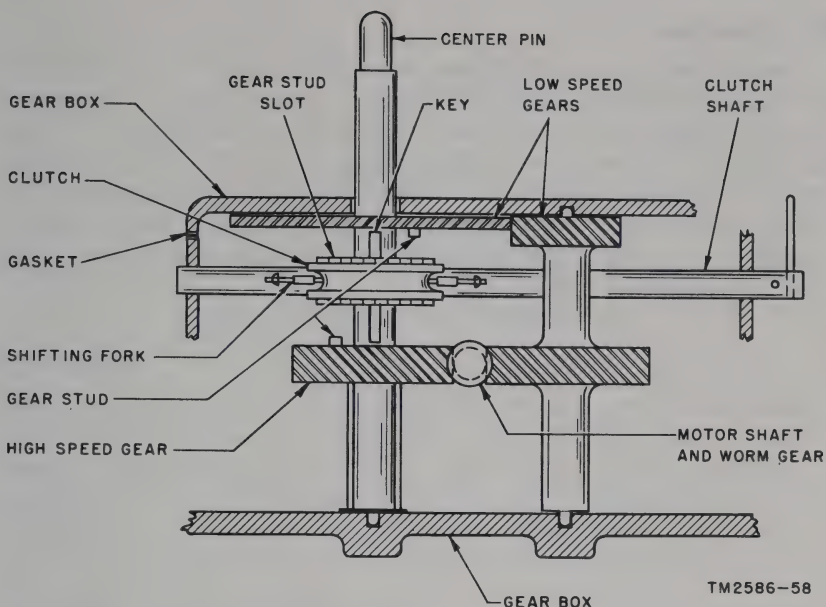


Figure 44. Gear box, cutaway view.

gear on the motor shaft drives the high speed gear and the low speed gear. A clutch is mounted on the lower portion of the center pin and is coupled to the center pin by a key on the shaft, and a keyway in the clutch. The clutch is held by a shifting fork, mounted on the clutch shaft. The clutch shaft is controlled by the speed selector lever.

### 83. Operation at 78 Rpm

(fig. 44)

When the speed selector lever is moved to the 78 position, the clutch is lowered and the gear stud on the high speed gear fits into a gear stud slot in the clutch. The clutch then turns at the speed of the high speed gear and turns the center pin by means of the key and keyway. The turntable platen is fastened to the center pin and will revolve at the speed of the center pin.

### 84. Operation at $33\frac{1}{3}$ Rpm

(fig. 44)

When the speed selector lever is operated to the  $33\frac{1}{3}$  position, the clutch shaft turns and raises the clutch to the low speed gear. The gear stud on the low speed gear fits into the gear stud slot in the clutch and causes the clutch to turn at the speed of the low speed gear. The center pin turns at the speed of the clutch, and the turntable platen turns at the speed of the center pin.

## **85. Governor**

The governor, at the end of the motor shaft, consists of two pivoted springs with weights at the centers and a friction plate. A housing covers the governor. At the rear of the housing is an oil pad. When the speed of the motor shaft increases, the centrifugal force on the governor weights causes them to move out from the shaft and bend the springs that support the friction plate. This forces the friction plate against the oil pad. This procedure will slow the motor down and maintain a constant motor speed.

## CHAPTER 6

### FIELD MAINTENANCE

#### Section I. PREREPAIR PROCEDURE

##### 86. General

When equipment has been turned in for repair, check it for completeness and condition by performing the preventive maintenance procedure outlined in paragraph 56. Check the preventive maintenance forms to find deficiencies that could not be corrected by the organizational maintenance men. Check the equipment for tags or notes which may indicate the condition of the equipment.

##### 87. Tools and Test Equipment

The following tools and test equipment are required for the repair of the PA set:

Tools or test equipment	Function
Multimeter TS-352/U-----	Voltage, resistance, and continuity checks.
Tool Equipment TE-113-----	Disassembling equipment and replacing parts.
Moisture, Fungiproofing Kit MK-2/GSM	Fungiproofing.
Audio Oscillator TS-382/U-----	Testing circuitry.
Electron Tube Test Set TV-2/U-----	Testing tubes.
Electronic Multimeter ME-6A/U-----	Measuring output and stage gain.
Spectrum Analyzer TS-723/U-----	Testing output distortion.
Variable Power Transformer CN-16/U---	Supplying steady input voltage.

##### 88. Inspecting and Cleaning

*a. Inspecting.* Make a visual inspection to determine the condition of the equipment when it is turned in for repairs. Remove the amplifier chassis from the amplifier case, remove the turntable chassis from the turntable case, remove the components from the speaker case. Remove the base plate from the bottom of the amplifier chassis. Remove the turntable unit from the turntable chassis. Inspect the equipment as outlined below:

- (1) Inspect all the components for indications of burning.



- (2) Inspect the wires and cords for broken leads, brittle or damaged insulation, and corrosion.
- (3) Inspect all the connections of all the components for broken leads, broken lugs, and poorly soldered connections.
- (4) Inspect the lamp and fuse holders for bent contacts, damaged covers, and corrosion.
- (5) Check the operation of all switches. They should have positive action. Inspect for any corrosion.
- (6) Inspect for loose, damaged, or missing screws.

*b. Cleaning.*

- (1) Clean the outside of the equipment with a clean cloth.
- (2) Remove dirt from the outside of the equipment with a cloth moistened in clear water. Dry the equipment before attempting any further cleaning.
- (3) Use air pressure, if available, to blow out accumulated dust, dirt, sand, lumps of solder, and wire cuttings. If air pressure is not available, use a soft bristled brush. Use an orange stick or spudger to dislodge caked dirt. Be careful not to damage the wiring.
- (4) Remove oil and grease with a cloth moistened with carbon tetrachloride.

**Caution:** Repeated contact of carbon tetrachloride with the skin or prolonged breathing of the fumes is dangerous. Make sure adequate ventilation is provided.

- (5) Remove corrosion, fungus growth, and similar foreign material with No. 000 sandpaper, or a brush. Clean with carbon tetrachloride when necessary.

## **89. Preparation for Testing**

Reassemble and replace the amplifier and turntable chassis in their cases. Connect the equipment in accordance with the instructions in paragraphs 22 through 34. Refer to the equipment performance check list (par. 67) for operational procedure.

## **Section II. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL**

### **90. Troubleshooting Data and Procedure**

The first step in servicing defective equipment is to sectionalize the fault. Sectionalization means tracing the fault to the major component or circuit. The second step is to localize the fault. Localization means tracing the fault to the defective part. Some defective parts such as burned out lamps, fuses, resistors, capacitors, transformers, and controls, can be located by smell, sight, or hearing. Many troubles can be localized by checking the switches, controls, and

connections of the component in question. Before troubleshooting, refer to the schematic diagrams and to the applicable illustrations to locate parts indicated by the symbols on the circuit schematic. The schematic diagrams and partial schematic diagrams can be found in figures 31 and 43, and 62, 63, and 64.

## **91. General Precautions**

Whenever a component of the PA set is to be serviced, observe the following precautions:

*a.* Only competent repairmen supplied with suitable tools and equipment are authorized to service or repair this equipment. An inexperienced person attempting to repair the equipment may damage it and necessitate major repair. Careless workmanship may cause new faults.

*b.* When removing or repairing defective parts and circuit elements, be careful not to damage adjacent parts by pulling or pushing them out of the way.

*c.* Before a part is unsoldered, note the position of the leads. If a part, such as a switch, has numerous terminals, tag each lead before unsoldering it.

*d.* Do not allow drops of solder to fall into the equipment. They may cause short circuits.

*e.* Do not use more solder than necessary to make a secure connection. Well-soldered joints are important because a poorly soldered joint is very hard to locate.

*f.* When a part is replaced, it must be positioned the same as the original part and must have the same electrical value. Use leads of the same length as the original leads. When replacing resistors or capacitors, refer to the color code charts (figs. 60 and 61).

*g.* Become familiar with the operation and theory of the PA set. The detailed functioning of the PA set is covered in chapter 5. The troubleshooting chart (par. 92) should be used as a reference when attempting to locate trouble in the equipment.

## **92. Troubleshooting Chart**

The chart below, lists the symptom, probable cause, and a suggested correction for common troubles. For detailed troubleshooting procedures, refer to paragraphs 93 through 96.

Symptom	Probable cause	Correction
1. Power indicator lamp does not light.	<ul style="list-style-type: none"> <li>a. Power switch in OFF position.</li> <li>b. No voltage from the power source.</li> <li>c. Power cord connector not making good contact.</li> <li>d. Burned out indicator lamp.</li> <li>e. Blown fuse-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Operate power switch to ON.</li> <li>b. Check the power cord, repair if defective.</li> <li>c. Tighten connector.</li> <li>d. Replace lamp (par. 70b).</li> <li>e. Replace fuse (par 70a).</li> </ul>
2. No sound output from amplifier.	<ul style="list-style-type: none"> <li>a. Bad input circuit-----</li> <li>b. Defective tubes-----</li> <li>c. Defective interconnecting cords.</li> <li>d. Defective speaker-----</li> <li>e. Defective speaker-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Check and repair input unit.</li> <li>b. Check and replace defective tubes (par. 65).</li> <li>c. Test and repair cords (par. 68b).</li> <li>d. Tighten connections.</li> <li>e. Test and repair or replace speaker (par. 10a).</li> </ul>
3. No sound output at monitor jack.	<ul style="list-style-type: none"> <li>a. Defective headset-----</li> <li>b. Defective headset cord</li> <li>c. Dirty jack contacts----</li> <li>d. Bent jack contacts----</li> <li>e. Defective connection to output transformer.</li> </ul>	<ul style="list-style-type: none"> <li>a. Test and repair or replace defective headset.</li> <li>b. Test and repair or replace headset cord (par. 72).</li> <li>c. Clean jack contacts</li> <li>d. Straighten contacts.</li> <li>e. Reconnect wire (par. 68d).</li> </ul>
4. No output when using HI-IMP-MIC-1 or LOW-IMP-MIC-1.	<ul style="list-style-type: none"> <li>a. Defective tube VI-----</li> <li>b. Defective resistor R4--</li> </ul>	<ul style="list-style-type: none"> <li>a. Test and replace VI if defective (par. 55).</li> <li>b. Replace R4.</li> </ul>
5. No output when using HI-IMP-MIC-2 or LOW-IMP-MIC-2.	<ul style="list-style-type: none"> <li>a. Defective tube VI-----</li> <li>b. Defective resistor R5--</li> </ul>	<ul style="list-style-type: none"> <li>a. Test and replace VI if defective (par. 65).</li> <li>b. Replace R5.</li> </ul>
6. No output when using turntable.	<ul style="list-style-type: none"> <li>a. Defective turntable---</li> <li>b. Dirty or bent contacts on jack J3.</li> <li>c. Switch S4 not in PHONO position.</li> <li>d. Resistor R25 defective.</li> <li>e. Defective tube V2-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Test and repair turntable (par. 99).</li> <li>b. Clean and straighten the contacts.</li> <li>c. Operate the switch to the PHONO position.</li> <li>d. Replace R25.</li> <li>e. Test and replace tube V2 (par. 65).</li> </ul>

Symptom	Probable cause	Correction
7. No output when using the line circuit.	<ul style="list-style-type: none"> <li>a. Switch S4 not in the LINE position.</li> <li>b. Resistor R25 defective.</li> <li>c. Defective tube V2-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Operate the switch to LINE.</li> <li>b. Replace R25.</li> <li>c. Test and replace tube V2 (par. 65).</li> </ul>
8. No output when using a carbon microphone.	<ul style="list-style-type: none"> <li>a. Defective carbon microphone.</li> <li>b. Dirty or bent contacts on jack J4.</li> <li>c. No dc to the microphone.</li> <li>d. Switch S1 is not in the C. MIC. position.</li> <li>e. Defective resistor R26.</li> <li>f. Defective tube V2-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace the microphone.</li> <li>b. Clean and straighten the contacts.</li> <li>c. Test the components of the power supply that provide dc. Replace defective parts (par. 98).</li> <li>d. Operate switch S1 to the C. MIC. position.</li> <li>e. Replace resistor R26.</li> <li>f. Test and replace tube V2 (par. 65).</li> </ul>
9. No output when using radio.	<ul style="list-style-type: none"> <li>a. Defective radio-----</li> <li>b. Dirty or bent contacts on jack J5.</li> <li>c. Switch S1 is not in the RADIO position.</li> <li>d. Defective resistor R26.</li> <li>e. Defective tube V2-----</li> </ul>	<ul style="list-style-type: none"> <li>a. Repair or replace the radio.</li> <li>b. Clean or straighten the contacts.</li> <li>c. Operate switch S1 to the RADIO position.</li> <li>d. Replace resistor R26.</li> <li>e. Test and replace tube V2 (par. 65).</li> </ul>
10. Distorted output----	<ul style="list-style-type: none"> <li>a. Defective loudspeaker driver.</li> <li>b. Tube V4 or V5 defective.</li> <li>c. Phase inverter tube defective.</li> <li>d. Impedance of output transformer and speakers not matched.</li> <li>e. Weak tube-----</li> <li>f. Defective input unit---</li> <li>g. Defective turntable needle.</li> <li>h. Turntable speed selector on wrong speed setting.</li> <li>i. Defective record-----</li> <li>j. Gain control too high--</li> </ul>	<ul style="list-style-type: none"> <li>a. Repair or replace loudspeaker driver (par. 100).</li> <li>b. Test and replace the defective tube (par. 65).</li> <li>c. Test and replace tube V3.</li> <li>d. Change the connection on the output transformer.</li> <li>e. Test and replace tubes (par. 65).</li> <li>f. Repair or replace input unit.</li> <li>g. Replace needle (par. 71b).</li> <li>h. Operate speed selector lever to proper speed setting (par. 43c).</li> <li>i. Replace record.</li> <li>j. Lower gain control.</li> </ul>

Symptom	Probable cause	Correction
11. Turntable does not turn.	<i>a.</i> Power not connected. <i>b.</i> POWER switch not on. <i>c.</i> Motor switch not on. (AN/TIQ-2) only. <i>d.</i> Fuse blown. <i>e.</i> Broken gears.	<i>a.</i> Connect power (par. 24). <i>b.</i> Operate switch to 115 or 230 position. <i>c.</i> Operate MOTOR switch to ON. <i>d.</i> Replace fuse (par. 70a). <i>e.</i> Repair and replace gears (par. 99).
12. No output when using turntable; amplifier good.	<i>a.</i> Dirty or bent contacts of output jack. <i>b.</i> Bent, broken, or missing needle. <i>c.</i> Open circuit in pickup arm.	<i>a.</i> Clean and straighten contacts. <i>b.</i> Replace needle (par. 71b). <i>c.</i> Test and repair circuit.

### 93. Voltage and Resistance Values

Weak, shorted, and open components of the amplifier will affect the voltages at various points in the circuit. These voltage differences often lead the repairman to the defective stage in the amplifier.

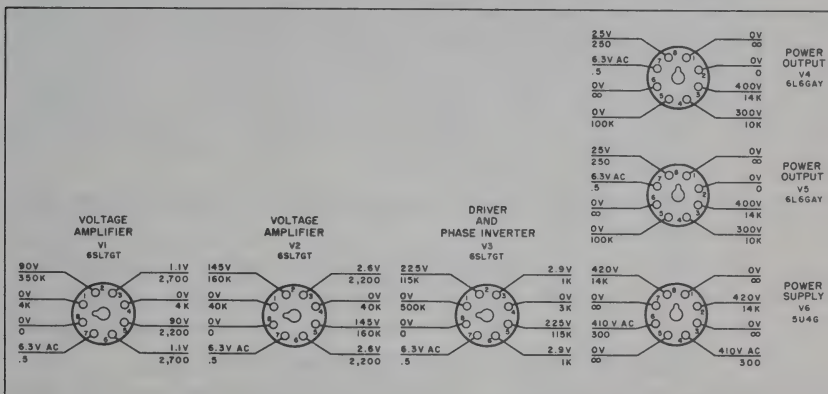
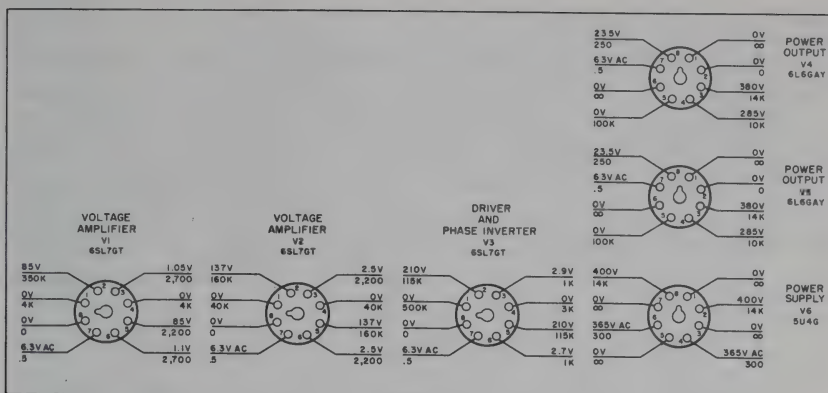
*a.* Prepare Multimeter TS-352/U for making the voltage checks. Connect the negative lead to the amplifier chassis. Use the positive lead to touch the terminals (fig. 45). Before making any voltage tests, set the voltmeter selector switch to a voltage-range higher than the expected voltage to be read. Turn the PHONO-LINE gain control to 0. The expected voltages are listed at the tube pins in figure 45. It is not necessary to test the tubes in the sequence they appear in figure 45.

*b.* Prepare the multimeter for making resistance checks. Disconnect all power from the equipment. Discharge all filter capacitors. The resistance values given in figure 45 are those values between the pin and the chassis. The gain controls may be in any position except the PHONO OR LINE control which must be set to 0. When reading the resistance of a single resistor, disconnect one side of the resistor from the circuit to prevent a false reading. To determine the value of a resistor for replacement purposes, refer to the resistance color code in figure 60.

### 94. Testing Capacitors

Open or shorted capacitors frequently cause trouble. Capacitors can be checked with an ohmmeter but this will only indicate if the capacitor is open or shorted. To test for shorts, prepare the multimeter for reading resistance. Disconnect the capacitor on one side. Place the two test leads from the multimeter across the leads of the





NOTE:  
RESISTANCE MEASUREMENTS BELOW LINE,  
VOLTAGE MEASUREMENTS ABOVE LINE

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Figure 45. Voltage and resistance diagram.

capacitor. If the capacitor is shorted, the meter should show a full-scale deflection. To test for open capacitors, reverse the two test leads and watch the meter. If the capacitor is good, the needle should give a slight movement as the capacitor discharges through the meter. When replacing capacitors, refer to the capacitor color code in figure 61.

## 95. Testing Coils

To check the coils or windings of the transformers, prepare the multimeter for reading resistance. The impedance ratings of the coils given on the schematic are ac impedances. When connected for reading resistances the multimeter will read only dc resistance. If the windings of the coils of transformer show a low resistance on the meter, they will probably be good. Any deflection on the meter except a full-scale deflection (short) will prove continuity and the winding can be considered good.

## 96. Testing Amplifier

If the trouble is not located by using the voltage and resistance values (fig. 45), apply tone to each stage and listen to the output from a speaker. Remove the amplifier (fig. 46) from its case. Remove the base plate from the bottom of the chassis. Connect a speaker that is known to be good to the speakers terminals. Plug in Audio Oscillator TS-382/U. Adjust the oscillator to a 1,000-cycle output. Connect the shielded lead of the oscillator test leads to the chassis of the amplifier. Test with the other lead. Proceed as follows and test the parts listed or the connections to those parts.

a. Turn the audio oscillator on and wait a few minutes for it to warm up.

b. Touch pin 3 of tubes V4 and V5. A tone should be heard from the speaker. If no tone is heard, increase the output volume from the oscillator. If tone is heard on one pin, but not the other, the trouble is in transformer T1 or the SPEAKERS terminal.

c. Touch pin 5 of each tube. The tone should be louder and slightly distorted. If sound is not heard, test coupling capacitors C8 and C15, and resistors R31 or R11 and R12.

d. Touch pin 5 of tube V3. If tone is not heard, test resistors R29, R19, and capacitor C10.

e. Touch pin 4 of tube V3. If tone is not heard, test resistor R12.

f. Touch pin 2 of tube V3. If tone is not heard, test resistor R30.

g. Touch pin 1 of tube V3. If tone is not heard, test resistors and capacitors of the tone control circuit. Test capacitor C4.

h. Touch pin 2 of tube V2. If tone is not heard, test resistors R28, R18, and capacitor C9.

i. Touch pin 1 of tube V2. If tone is not heard, test resistors R6, R5, and R4, and capacitor C3.

j. Touch pin 4 of tube V2. If tone is not heard, test resistors R25 and R26.

k. Touch pin 2 of tube V1. If tone is not heard, test resistors R3 and R2, and capacitor C1.

l. Touch pin 5 of tube V1. If tone is not heard, test resistor R17.

m. Touch pin 1 of tube V1. If tone is not heard, test resistor R1.

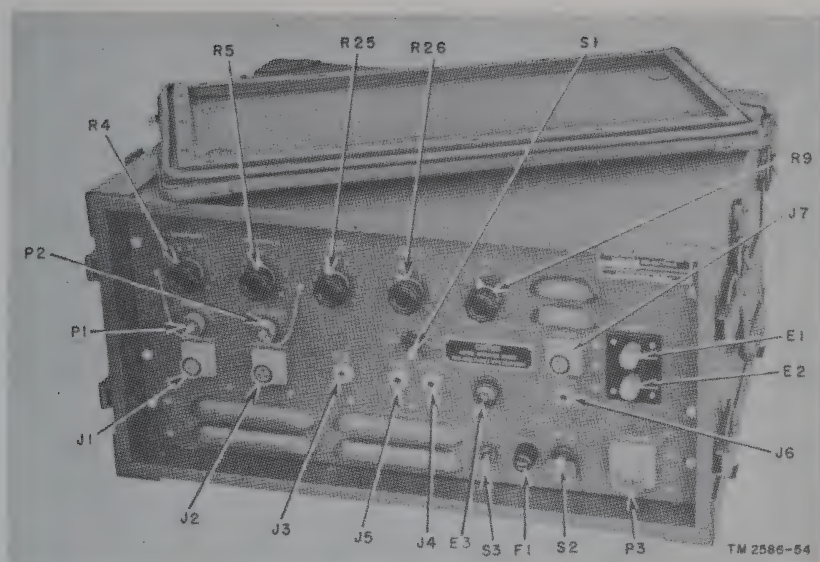
n. Touch pin 4 of tube V1. If tone is not heard, test resistor R14.

o. Touch the center pin on connectors P1 and P2. If tone is not heard, test resistors R1 or R14.

p. Touch pin B on connectors J1 and J2. If tone is not heard, test transformers T3 and T4.

q. Operate switch S4 to the PHONO position. Touch the tip of jack J3. If tone is not heard, test resistors R25 and R26.

r. Operate switch S4 to the LINE position. Touch the tip of jack J3. If tone is not heard, test transformer T5.



**Figure 46.** Amplifier AM-20(\*)/TIQ-2, control panel.

s. Operate switch S1 to the RADIO position. Touch the tip of jack J5. If tone is not heard, test resistors R25 and R26.

t. Operate switch S1 to the C.MIC. position. Touch the tip of jack J4. If tone is not heard, test capacitor C13 and transformer T6.

### Section III. DISASSEMBLY AND REASSEMBLY

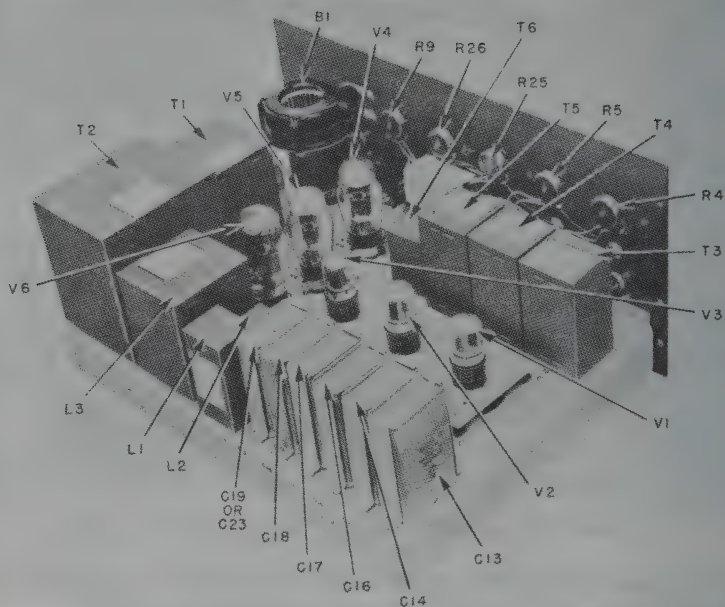
#### 97. General

This section covers the disassembly and reassembly of the components for the purpose of replacing parts and making adjustments. The paragraphs in this section will explain in detail the steps that must be taken to completely disassemble the components. When it is desired to replace a part which is accessible without disassembling the entire unit, perform only those steps necessary to reach the part. To reassemble the equipment, reverse the procedure. When steps refer to unsoldering, the reverse of unsoldering would be to reconnect and resolder. If the step is to loosen and remove a nut or screw, the reverse would be to replace the nut or screw. On the turntable especially, the components should be disassembled in the order given, and then reassembled by reversing the order.

#### 98. Disassembly of Amplifier Parts

(figs. 46, 47, and 48)

a. *Lamp Holder.* To remove the lamp holder, remove the cap from the front of the control panel. Unsolder the two leads from the rear



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Figure 47. Amplifier chassis, rear view.

of the lampholder. Loosen the hexagonal nut from the rear of the control panel and remove it. Remove the lamp holder.

*b. Fuse Holder.* To remove the fuse holder, remove the cap from the front of the control panel. Remove the fuse from the holder. Unsolder the two leads from the rear of the fuse holder. Unscrew the hexagonal nut from the rear of the fuse holder and remove it. Remove the fuse holder.

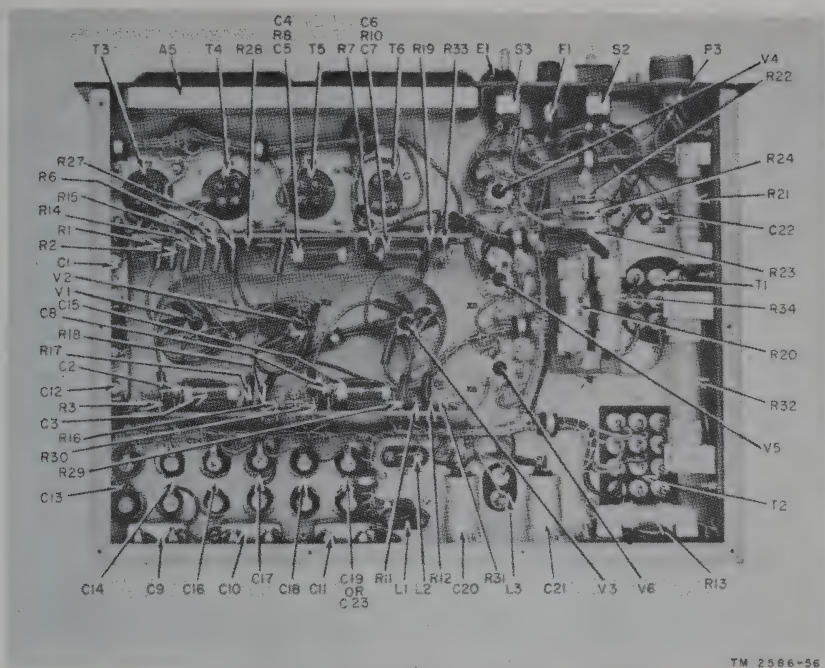
*c. Filter Capacitors and Coils.* Remove the nuts and lock washers from the mounting screws that protrude through the chassis. Unsolder the wires from the terminals. Lift the coil or capacitor from the chassis.

*d. Transformers.* Unsolder the leads from the terminals. Remove the nuts and lock washers from the mounting screws that protrude through the chassis. Remove the transformer.

*e. Controls.* Unsolder the leads from the terminals of the control. Remove the bakelite knob from the shaft of the control on the front of the control panel. Loosen the hexagonal nut from the front of the control and remove it. Remove the control.

*f. Connectors.* Unsolder the wires from the terminals. Unscrew the four screws that hold the connector to the control panel. Remove the connector.





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Figure 48. Amplifier chassis, bottom view parts location.

*g. Jacks.* Unsolder the wires from the terminals on the rear of the jack. Loosen and remove the hexagonal nut that holds the jack to the control panel. Remove the jack.

*h. Resistors and Capacitors.* On resistors and capacitors that are soldered in place, unsolder both terminals, and remove the part.

*i. Switches.* Unsolder the wires from the terminals of the switch. Loosen and remove the hexagonal nut that holds the switch to the control panel. Remove the switch.

*j. Blower.* Disconnect the wires from the motor. Unscrew the two screws that hold the motor to the mounting bracket on the inside of the control panel. Remove the motor.

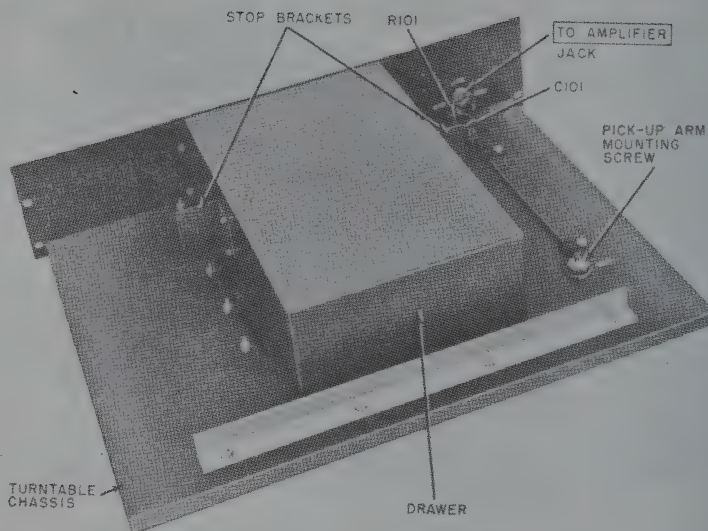
*k. Terminals.* Remove the wires that are connected to the rear of the terminals. Remove the four screws that hold the bakelite mounting to the control panel. Remove the terminals. To remove one of the terminals from the bakelite mounting, remove the two nuts from the rear of the terminal. Remove the terminal.

## 99. Disassembly of Turntable

### *a. Disassembly of Chassis.*

- (1) Remove the four screws and lock washers from the front of the chassis (two on each side). Remove the chassis from the case.





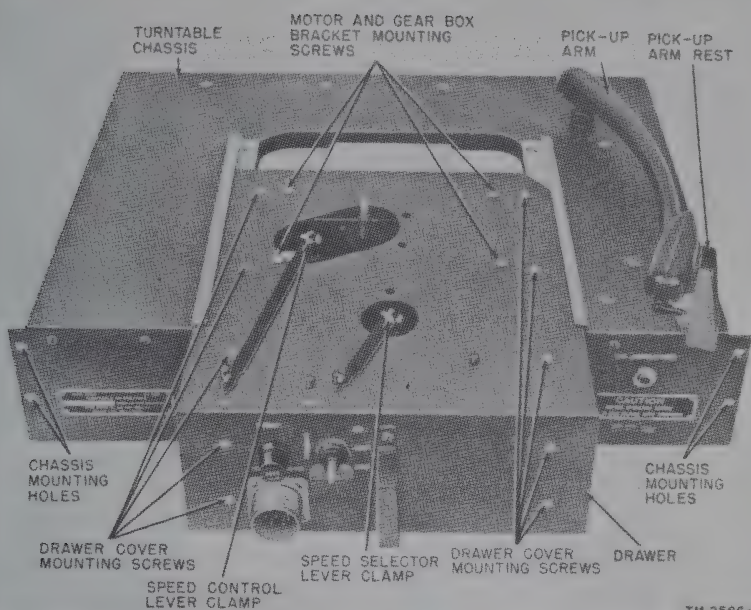
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**Figure 49. Turntable chassis, bottom view.**

- (2) Turn the chassis on its side.
- (3) Remove the two screws and lock washers that hold the stop brackets on each side of the turntable drawer (fig. 49). Remove the stop brackets.
- (4) Remove the turntable drawer from the chassis.
- (5) Remove the turntable platen by removing the clip from the top of the turntable platen. Insert a screwdriver into the hole of the clip and slide the clip away from the center pin. Remove the clip.
- (6) Remove the turntable platen by lifting it straight up.
- (7) Remove the speed selector lever (fig. 50) by loosening the clamping screw at the end of the lever and lifting up the lever.
- (8) Remove the speed control lever (fig. 50) by loosening the clamping screw from the end of the lever and lifting up the lever.

**b. Disassembly of Turntable Drawer.**

- (1) Remove the 10 drawer cover mounting screws, washers, and nuts that hold the cover (fig. 50) to the gear and motor unit, and remove the cover.
- (2) Remove the four screws, and self-locking nuts that hold the turntable gear box and motor unit mounting brackets (fig. 51) to the turntable drawer.



*Figure 50. Turntable chassis, platen removed.*

- (3) Remove the four screws that hold the mounting brackets to the gear box and motor unit.

**Caution:** There are two rubber cushions on each screw, and a hollow tube for the cushions.

- (4) Unsolder the two turntable motor leads at the switch and the transformer.

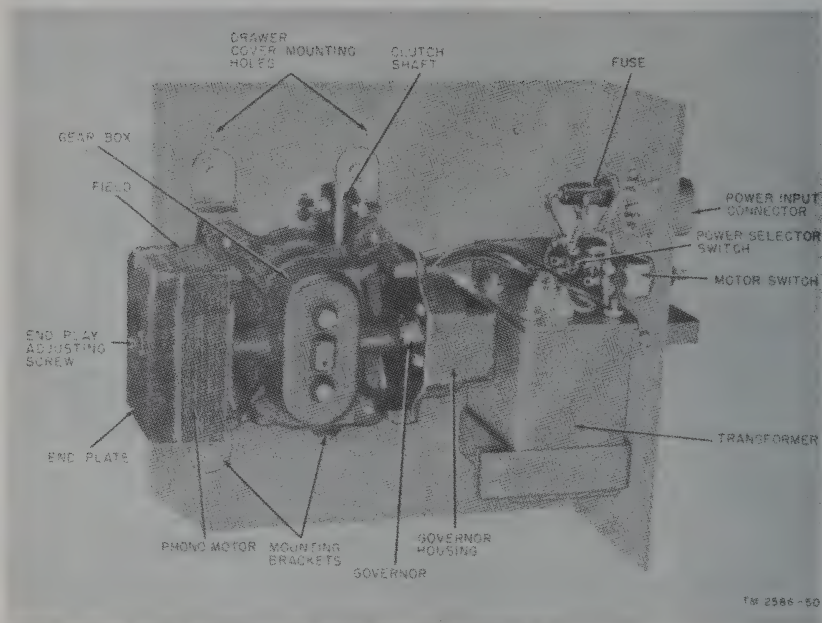
*Note.* The gear box and motor assembly can be completely disassembled without unsoldering the wires.

*c. Disassembly of Governor (fig. 52).*

- (1) Remove the governor housing by removing the four screws that hold the governor housing to the gear box. Pull out the governor housing.
- (2) Loosen the set screw that holds the governor to the motor shaft. Remove the governor.

*d. Disassembly of Gear Box and Motor.*

- (1) Remove the two rubber washers and the metal driving washer from the center pin.
- (2) Remove the four screws that hold the gear box cover to the gear box (fig. 53).
- (3) Move the wire clamp and the wires coming from the motor out of the way.



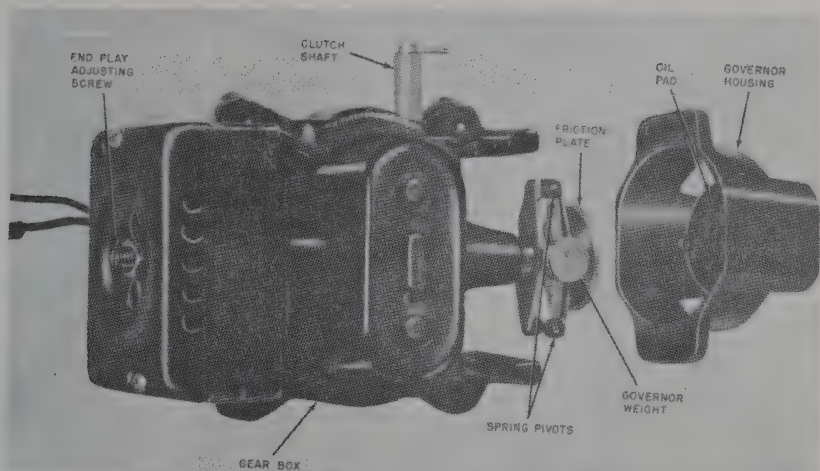
*Figure 51. Turntable drawer, bottom view, cover removed.*

- (4) Lift the gear box cover gently. Do not damage the gasket under the cover.
- (5) Remove the low speed gear (fig. 53) by lifting it straight up.
- (6) Remove the clutch from the shifting forks by twisting the clutch shaft (fig. 53) until the shifting forks point upward. Remove the clutch.
- (7) Remove the high speed gear (fig. 53) by lifting it straight up.
- (8) Remove the end plate from the motor by removing the two screws that hold the end plate to the motor. These screws fasten to the gear box.
- (9) Gently pull the armature from the motor and the gear box.
- (10) Remove the two screws that hold the motor field to the gear box. Remove the field.

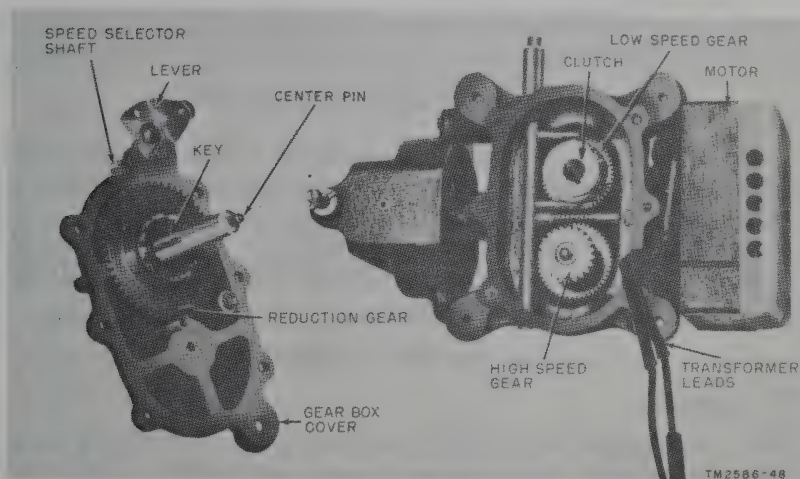
*Note.* Two guide pins align the motor so that the shaft will not bind. Do not damage the pins.

- (11) Remove the flat steel spring clip (fig. 54) that holds the oil pad to the bottom of the gear box. Remove the oil pad.
- (12) Rotate the bracket on the bottom of the case that holds the two oil wicks (fig. 54). Remove the wicks.





*Figure 52. Gear box and motor, governor housing removed*



*Figure 53. Gear box and motor, gear box cover removed.*

*e. Disassembly of Front Panel.* To disassemble the parts mounted on the control panel, follow the procedures given in paragraph 98 for removal of identical parts.

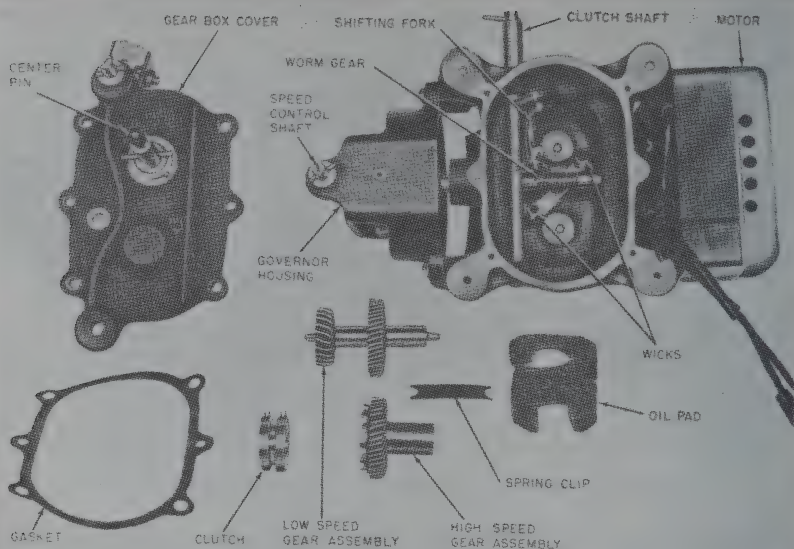
## 100. Disassembly of Loudspeaker

*a.* Remove the six screws which hold the terminal plate to the back cover.

*b.* Remove the six screws which hold the back cover to the frame.

*c.* Remove the back cover and the clamping ring.

*d.* On the LS-103A/TIQ-2 and LS-103B/TIQ-2, remove the set screw which holds the driver unit to the frame.



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Figure 54. Gear box and motor, gear box disassembled.

- e. Unsolder the two leads that extend from the driver unit to the transformer, and remove the transformer by removing the two screws that hold the driver unit and the transformer.
- f. Unscrew the driver unit from the frame.
- g. Unsolder the leads that connect the terminal plate to the transformer. Remove the terminal plate.

## Section IV. FINAL TESTING

### 101. General

When the components of the PA set have been repaired and are in operating condition, the maintenance man will perform a group of final tests to insure that the equipment is functioning properly. These tests will measure the stage gains, distortion, and hum level. He will test the amplifier, turntable, and speakers. In addition to the test equipment listed in paragraph 87, the following material is needed.

Part	Value	Tolerance	Voltage	Wattage	Quantity
Resistor-----	100 ohms-----	± 10%-----	-----	1/2	-----
Resistor-----	250 ohms-----	± 5%-----	-----	30	1
Resistor-----	3,900 ohms-----	± 10%-----	-----	1/2	1
Resistor-----	10,000 ohms-----	± 10%-----	-----	1/2	1
Capacitor-----	.3 $\mu$ f-----	+ 20-10%-----	400 VDCW-----	-----	1
Stroboscope card-----	-----	-----	-----	-----	1
Test record-----	-----	-----	-----	-----	1



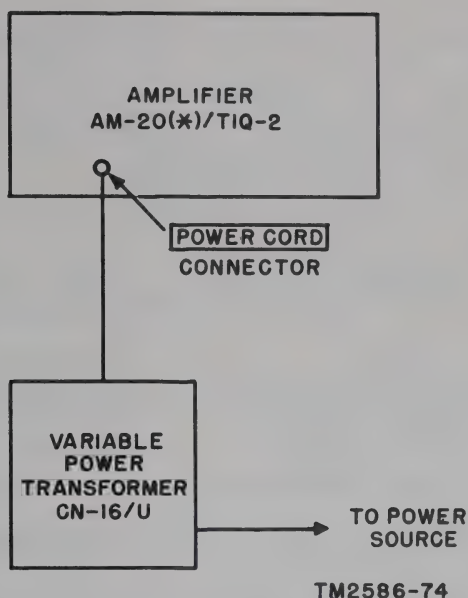


Figure 55. Power connection for amplifier under test.

## 102. Loudspeaker Test

Connect the speaker to the amplifier SPEAKERS terminals when a test record is being played on the turntable. The sound from the speakers should be clear and intelligible. When sound is coming from the speaker, the TONE control should be moved from its 0 position, to maximum in the TREBLE position, and maximum in the BASS position.

## 103. Power Gain Test

(figs. 55-57)

Test the gain of each channel by using a 1,000-cycle tone from Audio Oscillator TS-382/U (signal generator) and a 250-ohm resistor strapped across the SPEAKERS terminals. The input to each channel shall be at a different voltage level. The output voltage at the SPEAKERS terminals shall be 38 volts measured across the 250-ohm resistor. Set all gain controls at 0, except the gain control of the channel under test which should be set to maximum. Operate the TONE control to 0. Do not use the dummy load of the signal generator: Test each channel in the following manner:

a. Connect the amplifier as described in paragraph 23. When connecting the amplifier power cord to a power source, connect it to the output receptacles of Variable Power Transformer CN-16/U (fig. 55). Connect the power cord of the variable power transformer to the power source.

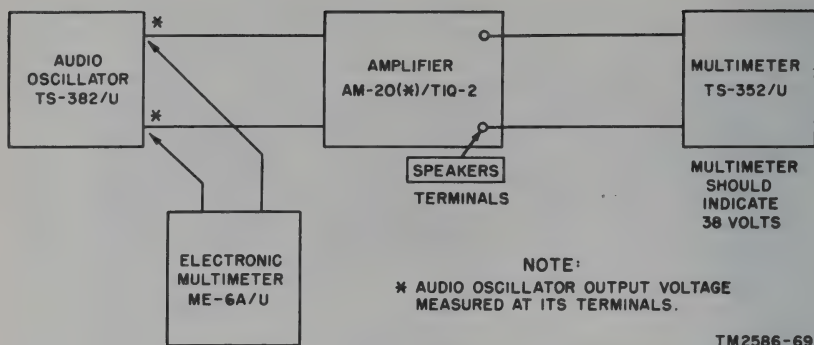


Figure 56. Test connection for power gain test of HI-IMP-MIC-1, HI-IMP-MIC-2, RADIO jack, and PHONO OR LINE jack with PHONO-LINE switch in PHONO position.

b. Turn on the amplifier, the signal generator, and Electronic Multimeter ME-6A/U.

c. Connect Multimeter TS-352/U to the SPEAKERS terminal. Set the meter to read on the 0-50v scale.

d. Connect a 10,000-ohm resistor in series with the LOW-IMP-MIC-1 jack, pin B.

e. Adjust the signal generator output voltage, measured at its output terminals, to .016 volt.

f. Test the LOW-IMP-MIC-1 channel. Multimeter TS-352/U connected across the SPEAKERS terminals should read 38 volts minimum.

g. Test the LOW-IMP-MIC-2 in the same manner described in d through f above.

h. Remove the 10,000-ohm resistor. Adjust the output voltage of the signal generator to .0026 volt.

i. Test the HI-IMP-MIC-1 and the HI-IMP-MIC-2 by touching the center terminal of the connector. The multimeter should read 38 volts minimum.

j. Adjust the output voltage of the signal generator to .25 volt.

k. Operate the PHONO-LINE switch to LINE.

l. Connect a 10,000-ohm resistor in series with the tip of the PHONE OR LINE jack.

m. Test the PHONO OR LINE jack; the output voltage should be 38 volts minimum.

n. Adjust the output voltage of the signal generator to .034 volt.

o. Remove the 10,000-ohm resistor from the PHONO OR LINE jack, and test the PHONO OR LINE jack with the PHONO-LINE switch in the PHONO position. The output voltage at the terminals should be 38 volts minimum.

p. Operate the RADIO-C.MIC. switch to the RADIO position.

q. Adjust the output voltage of the signal generator to .038 volt.

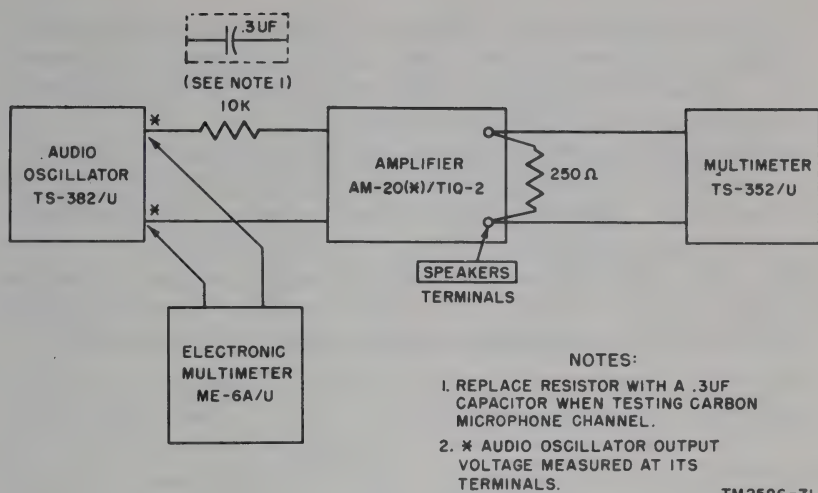


Figure 57. Test connection for frequency response test.

- r. Test the radio jack, the output voltage should be 38 volts minimum.
- s. Adjust the output voltage of the signal generator to .024 volt.
- t. Place a .3  $\mu$ f capacitor in series with the test lead.
- u. Operate the RADIO-C.MIC switch to C. MIC.
- v. Test the CARBON MICROPHONE jack. The output voltage should be 38 volts minimum.
- w. When all channels are correct, test any one of the channels when using a 230-volt power source. If the readings are still correct, it can be assumed that all channels are correct.

## 104. Frequency Response Test

(fig. 57)

To test the frequency response of the amplifier, place the TONE control in the TREBLE position, and then in the BASS position. The frequency applied to the amplifier will be changed, and the output voltage at the SPEAKERS terminals will be observed. Adjust all gain controls to 0. Prepare the signal generator to supply 1,000 cycles. Place a 250-ohm resistor across the SPEAKERS terminals. Proceed as follows:

- a. Place Multimeter TS-352/U across the 250-ohm resistor and prepare the multimeter to read 70.7 volts.
- b. Connect a 10,000-ohm resistor in series with the test lead of the signal generator.
- c. Connect the test lead of the signal generator to pin B of the LOW-IMP-MIC-1.
- d. Set the MICROPHONE 1 control to maximum.

- e.* Set the TONE control to maximum TREBLE (position No. 5).
- f.* Increase or decrease the output voltage of the signal generator until a voltage of 70.7 volts is read on the scale of the multimeter connected across the SPEAKERS terminals.
- g.* Measure and record the output voltage of the signal generator.
- h.* Change the frequency output of the signal generator as given in the chart below. Each time the frequency is changed, the output voltage of the signal generator must be equal to the voltage measured in *g* above. When the frequency is changed, and the voltage is equal to that indicated in *g* above, the voltage readings measured at the SPEAKERS terminals should agree with those in the chart below.

Cycles per second	Output voltage
50.....	10 volts max.
100.....	23 volts max.
400.....	64 volts max.
1,000.....	70.7 volts max.
5,000.....	50 volts min.
10,000.....	36 volts min.

- i.* Set the TONE control to the maximum BASS position (No. 5).
- j.* Set the signal generator to supply 400 cps.
- k.* Increase or decrease the output of the signal generator until a voltage of 70.7 volts is read at the multimeter connected across the 250-ohm resistor.
- l.* Read and record the output voltage of the signal generator.
- m.* With the TONE control in the BASS position, proceed as instructed in *h* above. When the frequency is changed, be sure that the output voltage of the signal generator is the same as that read in *l* above. The voltages at the SPEAKERS terminals should agree with those in the chart below, as the frequency is changed as indicated in the chart below.

Cycles per second	Output voltage
50.....	53 volts min.
100.....	56 volts min.
400.....	70.7 volts.
1,000.....	63 volts max.
5,000.....	19 volts max.
10,000.....	10 volts max.

## 105. Frequency Response of CARBON MIC. Channel

To test the frequency response of the CARBON MIC. channel, follow the same procedure given in paragraph 104.

- a. Operate the RADIO-C.MIC. switch to the C.MIC. position.
- b. Set all gain controls to 0, except the RADIO-CARBON MIC. control, which must be set to maximum.
- c. Set the TONE control to maximum TREBLE.
- d. Set the signal generator to supply 1,000 cycles.
- e. Place a .3- $\mu$ f capacitor in series with the test lead of the signal generator.

*f.* Test the CARBON MIC. jack. Adjust the output voltage of the signal generator until a reading of the multimeter across the 250-ohm resistor is 38 volts. Record the voltage of the signal generator output.

*g.* Change the signal generator output frequencies to those frequencies given in the chart below. Maintain the output voltage of the signal generator to that voltage given in *f* above. The output voltages measured on the multimeter connected to the SPEAKERS terminals should agree with the voltages in the chart below.

Cycles per second	Output voltage
250-----	4 volts max.
400-----	10 volts max.
1,000-----	38 volts.
4,000-----	75 volts min.

*h.* Set the output frequency of the signal generator for 400 cycles.

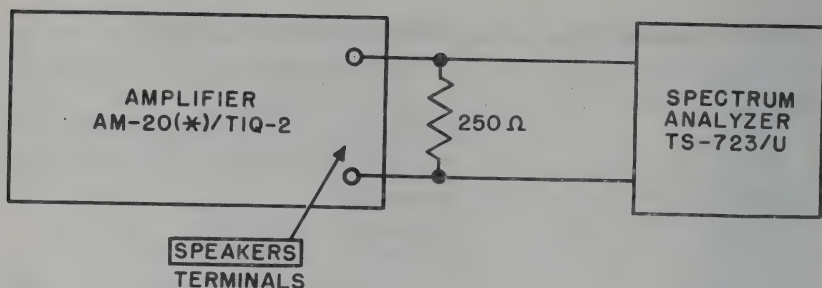
*i.* Set the TONE control to maximum BASS.

*j.* Adjust the output voltage of the signal generator until the multimeter across the 250-ohm resistor is 38 volts. Record the voltage of the signal generator.

*k.* Change the frequency output of the signal generator, maintaining the voltage recorded in *j* above, and read the output voltage of the amplifier on the multimeter connected across the 250-ohm resistor. The voltages should compare with those given in the chart below.

Cycles per second	Output voltage
250-----	27 volts max.
400-----	38 volts.
1,000-----	50 volts min.
4,000-----	55 volts min.





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Figure 58. Test connection for distortion test.

## 106. Distortion Test

(fig. 58)

To measure the amount of distortion that is produced by the amplifier, prepare the amplifier as follows:

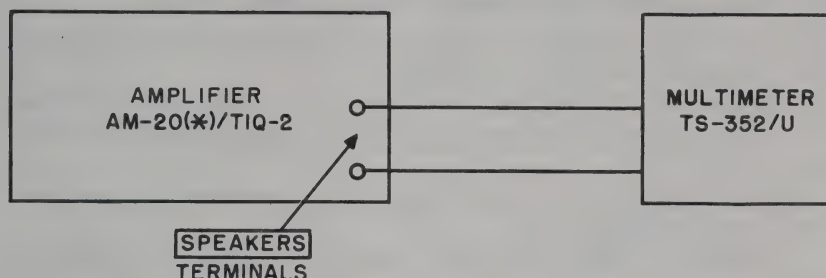
- Connect a 250-ohm resistor across the SPEAKERS terminals, and connect the multimeter across the resistor.
- Set the signal generator to produce 1,000 cycles.
- Connect a 10,000-ohm resistor in series with the test lead of the signal generator.
- Set the gain and tone controls to 0.
- Set the gain control marked MICROPHONE 1 to maximum.
- Connect the test lead of the signal generator to pin B of LOW-IMP-MIC-1.
- Adjust the output voltage of the signal generator until there is a 70.7-volt measurement on the multimeter connected across the output of the amplifier.
- Disconnect the multimeter from across the 250-ohm resistor and connect the test leads from Spectrum Analyzer TS-723/U across the resistor. The reading on the scale of the spectrum analyzer shall not exceed 6 percent of 70.7 volts.

## 107. Hum Level Test

(fig. 59)

Connect an electronic multimeter across the 250 ohms at the output of the amplifier. Turn all controls to 0. The meter should read .71 volt. Turn each gain control separately to maximum and observe the reading on the meter. The reading should correspond to those given below.

Gain control	Output voltage (volts max)
MICROPHONE 1.....	2. 25
MICROPHONE 2.....	2. 25
LINE.....	. 71
RADIO.....	. 71
PHONO.....	. 71
CARBON MIC.....	2. 25



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Figure 59. Test connections for hum level test.

## 108. Miscellaneous Tests

a. With the amplifier delivering 70.7 volts at its output terminals, across a 250-ohm load, the voltage across the BOOSTER connector terminals D and A, should not be less than .4 volt.

b. With the amplifier delivering 70.7 volts at its output terminals across a 250-ohm load, the voltage at the MONITOR jack will not be less than 2 volts when measured across a 3,900-ohm resistor connected to the jack.

c. The dc voltage at the CARBON MIC. jack shall not be less than 3.2 volts when measured across a 100-ohm resistor.

d. When a stroboscope disk is placed on the turntable platen and the turntable is operating, the speed control lever should control the speed of the record when the speed selector lever is in the 78- or 33 $\frac{1}{3}$ -rpm position.

e. The tone from the amplifier should be clear and intelligible when the test record is being played on the turntable.

f. The equipment should be connected for normal operation. Check the equipment for microphonic sounds by tapping the amplifier gently with a padded mallet.

g. When Microphone M-2/U is used, the equipment should reproduce clearly and intelligibly.

## CHAPTER 7

# SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

### Section I. SHIPMENT AND LIMITED STORAGE

#### 109. Disassembly for Shipment and Limited Storage

The following instructions are supplied as a guide for preparing the PA set for transportation and storage.

*a.* Disconnect all cables and wires from the components. Coil the wires up neatly and place them in their compartments in the speaker case.

*b.* Place the pickup arm of the turntable in the pickup arm rest, and tighten the clamping screw.

*c.* Unlatch the interlocking catch-fasteners that hold the turntable to the amplifier. Move the turntable off the amplifier. Fold the interlocking catch-fasteners neatly to the side of the case.

*d.* Place the covers on the amplifier and the turntable, and fasten the catch-fasteners.

*e.* Remove the microphone head from the microphone stand. Fold up the microphone stand. Place the microphone and the microphone stands in their proper places in the speaker case.

*f.* Lower the speaker stands if they are extended and remove the speaker from the speaker stand. Remove the driver unit from the speaker horn. Place the speaker horn and speaker driver units in their proper places in the speaker case. Fold up the speaker stand.

*g.* Fasten all catch-fasteners located inside the speaker case. Close the cover of the speaker case and fasten the catch-fasteners.

#### 110. Repacking for Limited Storage and Shipment

*a. Limited Storage.* When the PA set is to be stored for a limited time, it is packed in wood-cleated plywood or nailed wooden boxes.

*b. Shipment.* The materials needed to prepare the PA set for shipment are listed below.

Materials	Amount
Boxes, wooden shipping.....	2 ea.
Paper, corrugated, single-faced.....	175 sq. ft.
Tape, pressure-sensitive.....	50 ft.
Tape, paper, gummed.....	20 ft.
Tape, cotton.....	3 yd.
Wadding, cellulose.....	30 sq. ft.
Waterproof barrier material.....	150 sq. ft.

*c. Box Sizes.* The equipment may be packed in two or three boxes. The chart in (1) below indicates the sizes of Public Address Set AN/TIQ-2. The chart in (2) below indicates the sizes of Public Address Sets AN/TIQ-2A, and AN/TIQ-2B.

(1) *Public Address Set AN/TIQ-2.*

Case No.	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Unit weight (lb)
1-----	28	46	38	28	250
2-----	12	20	54	7	85
3-----	31	50	29	20	250

(2) *Public Address Sets AN/TIQ-2A and AN/TIQ-2B.*

Case No.	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Unit weight (lb)
1-----	48	41	50	55	350
2-----	12	20	54	7	85

*d. Packaging.* Pack the components of the PA set as follows:

- (1) Package each technical manual in a close-fitting bag made of waterproof barrier material.
- (2) Wrap spare tubes with cellulose wadding or single-faced corrugated paper, and secure them with gummed paper tape.
- (3) Record albums need no packaging.
- (4) Pack the running spares, record albums, microphone stands, cables, records, microphones and speakers in their own compartments in the speaker case, and fill all voids with flexible pads of corrugated paper to prevent the equipment from moving. On the AN/TIQ-2 only, the running spares will be cushioned and placed in the spare parts case.
- (5) Remove the amplifier chassis from its case so that the tubes can be cushioned. Cushion the tubes by wrapping each tube with a tight coil of single-faced corrugated paper that extends one-half inch above the top of the tubes. Fasten each tube to the chassis by means of pressure-sensitive tape. Replace the chassis in the amplifier case and fasten the cover.
- (6) Fasten the clamping screw on the pickup arm to the pickup arm rest, so that it cannot move. Block the pickup arm with a single-faced corrugated paper. Fasten the pickup arm with a strip of pressure-sensitive tape. Cushion the control panel with a piece of cellulose wadding and secure it with

pressure-sensitive tape. Place the cover on the turntable case and fasten the catch-fasteners.

- (7) Fold the speaker stands to their smallest size. Place a strap around the legs and fasten them snugly. Cushion the mounting studs and the top of the stands with single-faced corrugated paper. Fasten the cushioning with pressure-sensitive tape. Wrap the entire stand with single-faced corrugated paper and fasten it with gummed paper tape.

### 111. Packaging Public Address Set AN/TIQ-2

The AN/TIQ-2 is packed in three crates: the speaker case, Case CY-37/TIQ-2 in crate No. 1; the amplifier case, the turntable case, and the spare parts case in crate No. 2; each case is a CY-38/TIQ-2. The two speaker stands are in crate No. 3. The crates will be marked as follows:

Crate No.	Marking
1.....	$\frac{1}{2}$
2.....	$\frac{2}{3}$
3.....	$\frac{3}{3}$

### 112. Packaging Public Address Sets AN/TIQ-2A, AN/TIQ-2B, and AN/TIQ-2B (Modified)

The AN/TIQ-2A, AN/TIQ-2B, and AN/TIQ-2B (modified) are packed in two crates. Crate No. 1 will contain the turntable case and the amplifier case (both are Case CY-38/TIQ-2) placed on top of the speaker case (Case CY-37A/TIQ-2). Crate No. 2 will contain two speaker stands. The crates will be marked as follows:

Crate No.	Marking
1.....	$\frac{1}{2}$
2.....	$\frac{2}{2}$

## Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

### 113. General

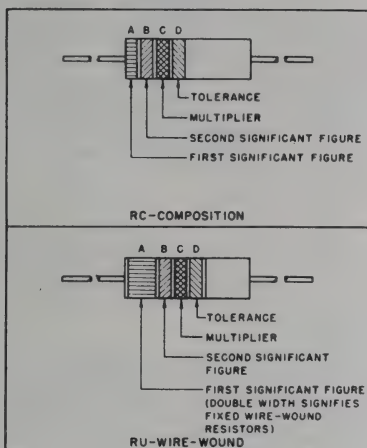
Use the demolition procedures outlined in paragraph 114 to prevent the enemy from using or salvaging this equipment. Demolish the equipment only upon order of the commander.

*Note.* Before attempting to demolish the equipment, remove the turntable chassis from its case; remove the amplifier chassis from its case; disassemble the speaker, and remove all the components from the speaker case.

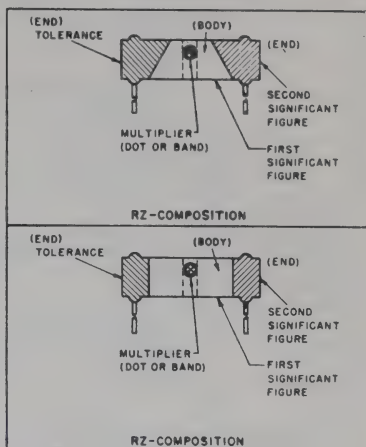


# RESISTOR COLOR CODE MARKING (MIL-STD RESISTORS)

## AXIAL-LEAD RESISTORS (INSULATED)



## RADIAL-LEAD RESISTORS (UNINSULATED)



## RESISTOR COLOR CODE

BAND A OR BODY*		BAND B OR END*		BAND C OR DOT OR BAND*		BAND D OR END*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1	BODY	$\pm 20$
BROWN	1	BROWN	1	BROWN	10	SILVER	$\pm 10$
RED	2	RED	2	RED	100	GOLD	$\pm 5$
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000		
GREEN	5	GREEN	5	GREEN	100,000		
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	GOLD	0.1		
WHITE	9	WHITE	9	SILVER	0.01		

\* FOR WIRE-WOUND-TYPE RESISTORS, BAND A SHALL BE DOUBLE-WIDTH. WHEN BODY COLOR IS THE SAME AS THE DOT (OR BAND) OR END COLOR, THE COLORS ARE DIFFERENTIATED BY SHADE, GLOSS, OR OTHER MEANS.

### EXAMPLES (BAND MARKING):

10 OHMS  $\pm 20$  PERCENT: BROWN BAND A; BLACK BAND B, BLACK BAND C; NO BAND D.  
4.7 OHMS  $\pm 5$  PERCENT: YELLOW BAND A, PURPLE BAND B; GOLD BAND C; GOLD BAND D.

### EXAMPLES (BODY MARKING):

10 OHMS  $\pm 20$  PERCENT: BROWN BODY, BLACK END, BLACK DOT OR BAND, BODY COLOR ON TOLERANCE END.  
3,000 OHMS  $\pm 10$  PERCENT: ORANGE BODY, BLACK END, RED DOT OR BAND, SILVER END.

STD-R1

Figure 60. MIL STD resistor color codes.

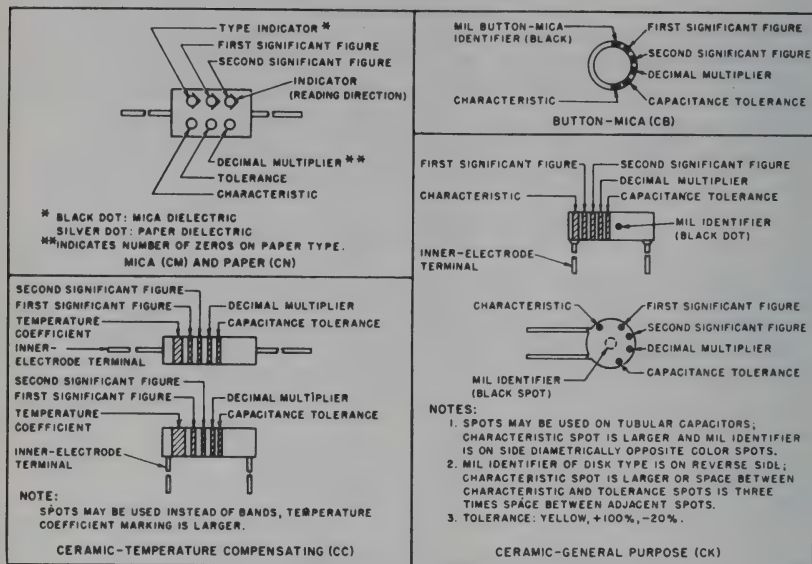
## 114. Methods of Destruction

*a. Smash.* Smash the controls, lamps, coils, resistors, capacitors, tubes, terminals, and headset; use sledges, axes, pickaxes, hammers, crowbars, or heavy tools.

*b. Cut.* Cut cords, wiring and cabling; use axes, handaxes, or machetes.

*c. Burn.* Burn coils, resistors, capacitors, wiring, cords, and tech-

# CAPACITOR COLOR CODE MARKING (MIL-STD CAPACITORS)



## CAPACITOR COLOR CODE

COLOR	SIG FIG.	MULTIPLIER		CHARACTERISTIC <sup>1</sup>				TOLERANCE <sup>2</sup>				TEMPERATURE COEFFICIENT (UUF/UF/°C)
		DECIMAL	NUMBER OF ZEROS	CM	CN	CB	CK	CM	CN	CB	CC	
BLACK	0	1	NONE		A			20	20	20	20	ZERO
BROWN	1	10	1	B	E	B	W				1	-30
RED	2	100	2	C	H		X	2		2	2	-80
ORANGE	3	1,000	3	D	J	D			30			-150
YELLOW	4	10,000	4	E	P							-220
GREEN	5		5	F	R						5	0.5
BLUE	6		6		S							-470
PURPLE (VIOLET)	7		7		T	W						-750
GRAY	8		8			X					0.25	+30
WHITE	9		9								10	-330 (±500) <sup>3</sup>
GOLD		0.1						5		5		+100
SILVER		0.01						10	10	10		

1. LETTERS ARE IN TYPE DESIGNATIONS GIVEN IN MIL-C SPECIFICATIONS.  
2. IN PERCENT, EXCEPT IN UUF FOR CC-TYPE CAPACITORS OF 10 UUF OR LESS.  
3. INTENDED FOR USE IN CIRCUITS NOT REQUIRING COMPENSATION.

STD-C1

Figure 61. MIL STD capacitor color codes.

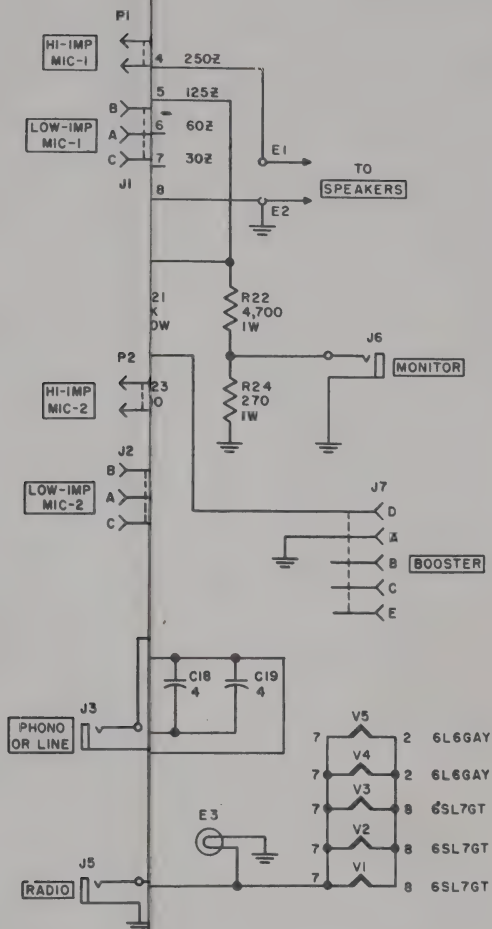
nical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. *Bend.* Bend the panels, chassis, turntable plate, and all framework; use crowbars or other heavy tools.

e. *Explosives.* If explosives are necessary, use firearms, grenades or TNT.

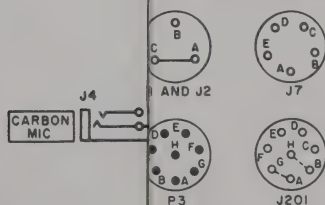
f. *Disposal.* Bury or scatter the destroyed parts in slit trenches, fox holes, or throw them into streams.

g. *Destroy.* Destroy everything.



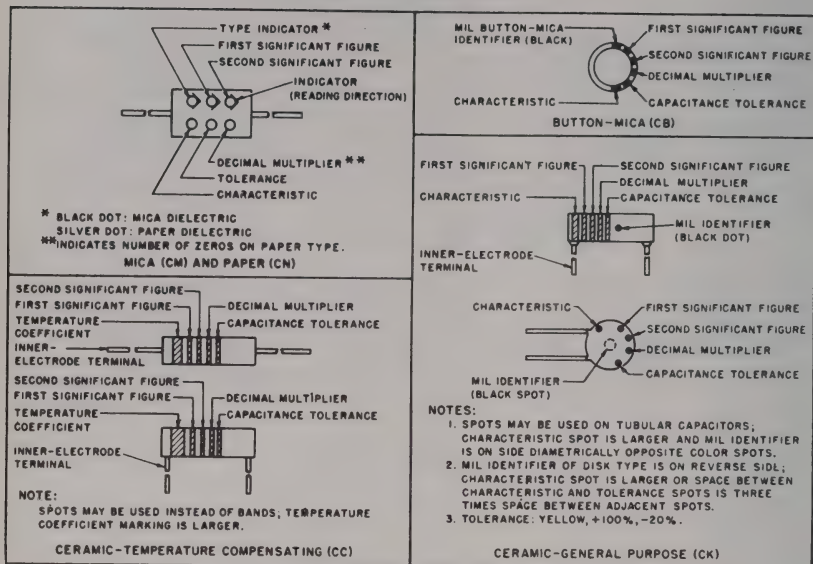
# NOTES:

UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.   
 INDICATES EQUIPMENT MARKING.



USE F1 WILL BE A 1 AMP FUSE WHEN OPERATING ON 230 VOLTS, AND WILL BE A 2 AMP FUSE WHEN OPERATING ON 115 VOLTS.

# CAPACITOR COLOR CODE MARKING (MIL-STD CAPACITORS)



## CAPACITOR COLOR CODE

COLOR	SIG FIG.	MULTIPLIER		CHARACTERISTIC <sup>1</sup>				TOLERANCE <sup>2</sup>				TEMPERATURE COEFFICIENT (UUF/UF/°C)
		DECIMAL	NUMBER OF ZEROS	CM	CN	CB	CK	CM	CN	CB	CC	
BLACK	0	1	NONE		A			20	20	20	20	ZERO
BROWN	1	10	1	B	E	B	W				1	-30
RED	2	100	2	C	H		X	2		2	2	-80
ORANGE	3	1,000	3	D	J	D			30			-150
YELLOW	4	10,000	4	E	P							-220
GREEN	5		5	F	R						5	-330
BLUE	6		6		S							-470
PURPLE (VIOLET)	7		7		T	W						-750
GRAY	8		8			X					0.25	+30
WHITE	9		9							10	1	-330(±500) <sup>3</sup>
GOLD		0.1						5		5		+100
SILVER		0.01						10	10	10		

1. LETTERS ARE IN TYPE DESIGNATIONS GIVEN IN MIL-C SPECIFICATIONS.  
2. IN PERCENT, EXCEPT IN UUF FOR CC-TYPE CAPACITORS OF 10 UUF OR LESS.  
3. INTENDED FOR USE IN CIRCUITS NOT REQUIRING COMPENSATION.

STD-C1

Figure 61. MIL STD capacitor color codes.

nical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. *Bend.* Bend the panels, chassis, turntable plate, and all framework; use crowbars or other heavy tools.

e. *Explosives.* If explosives are necessary, use firearms, grenades or TNT.

f. *Disposal.* Bury or scatter the destroyed parts in slit trenches, fox holes, or throw them into streams.

g. *Destroy.* Destroy everything.

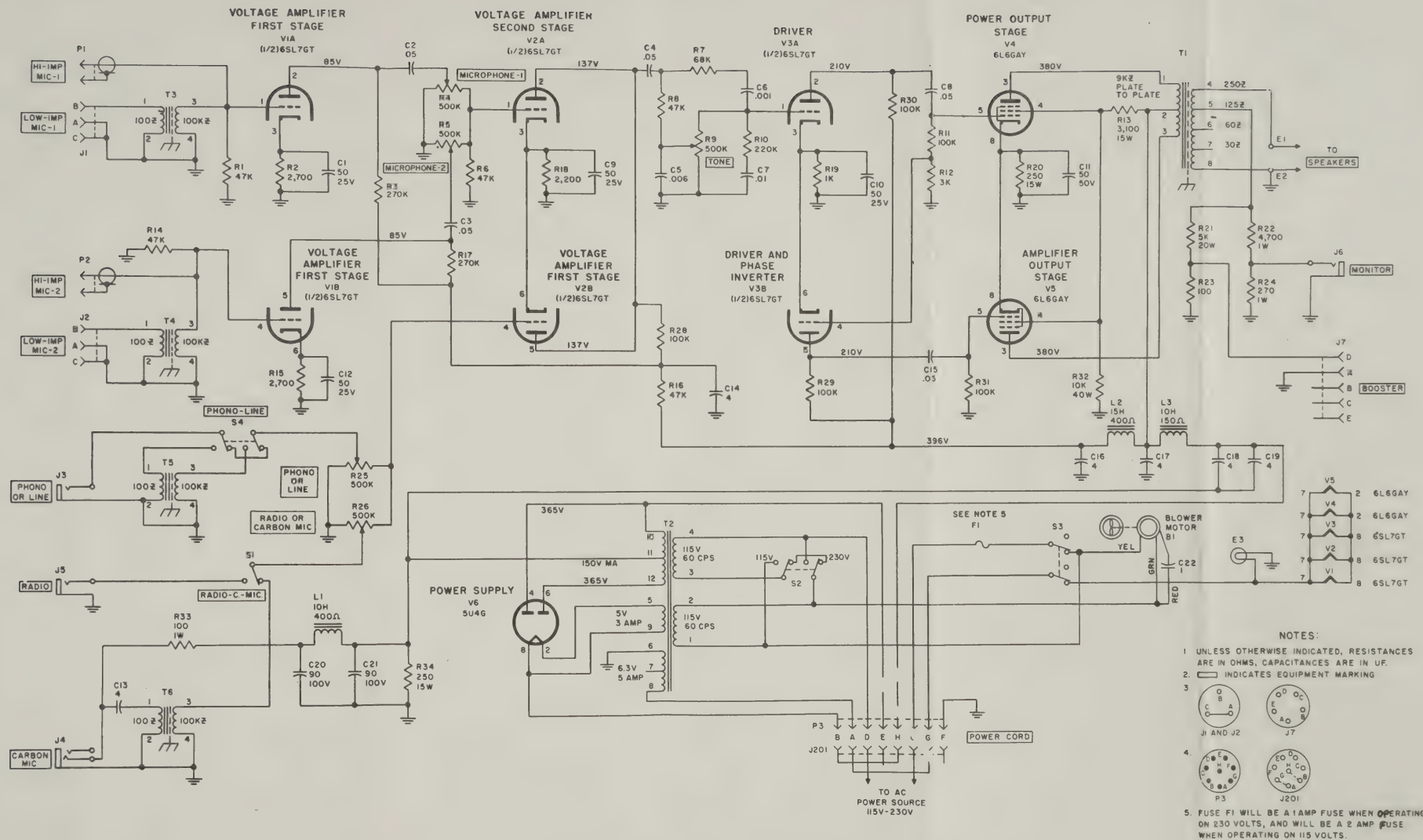
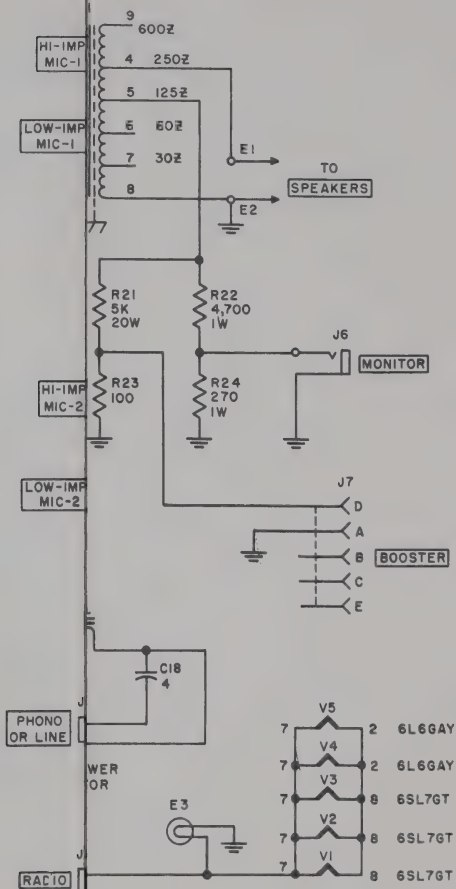


Figure 62. Amplifier AM-20/TIQ-2, schematic diagram







# NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. INDICATES EQUIPMENT MARKING.

3.



J1 AND J2



J7

4.



P3



J201

5. FUSE F1 WILL BE A 1 AMP FUSE WHEN OPERATING ON 230 VOLTS, AND WILL BE A 2 AMP FUSE WHEN OPERATING ON 115 VOLTS.
6. C23 IS MARKED C19 ON SOME MODELS OF AM-20A/TIQ-2.



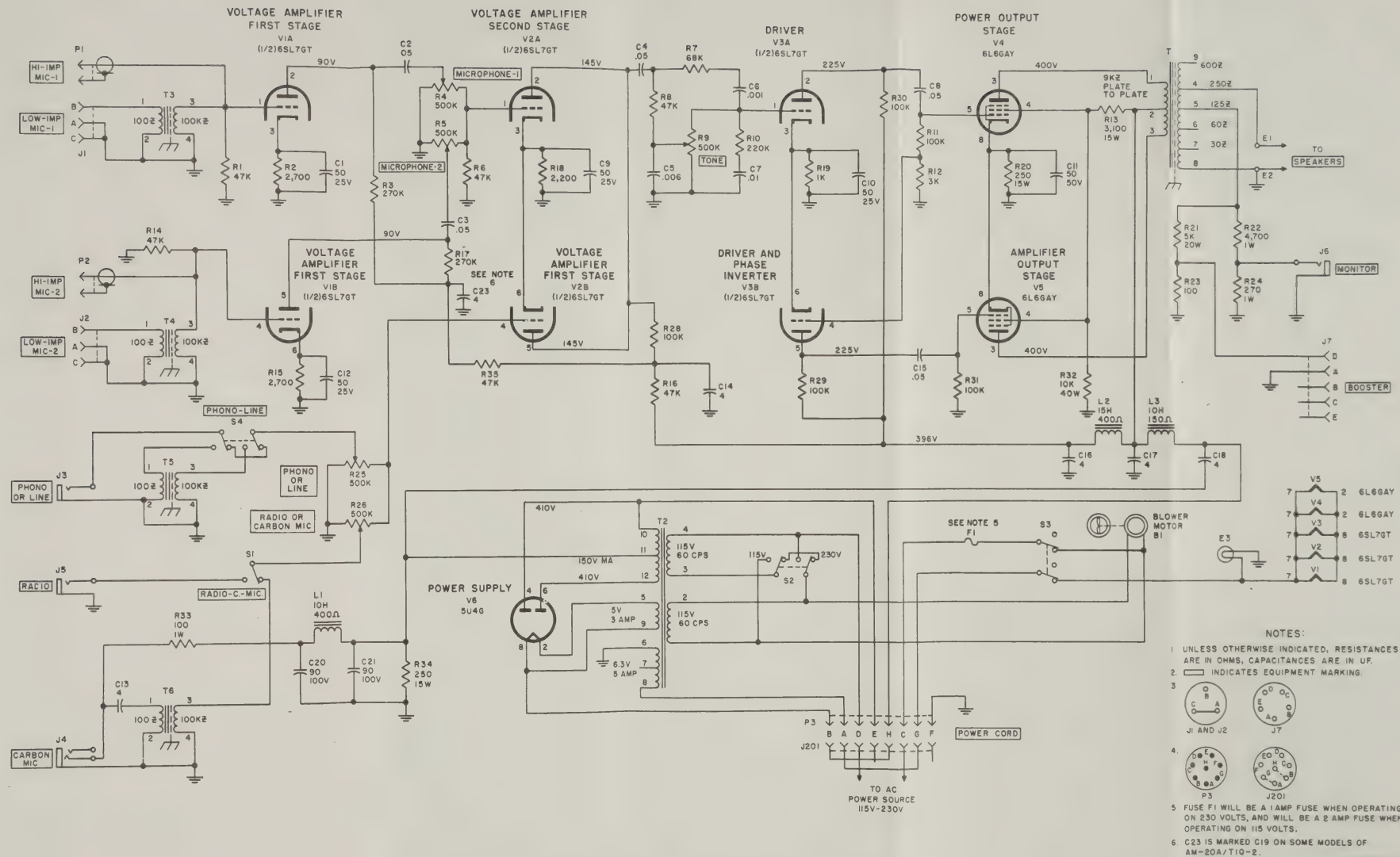
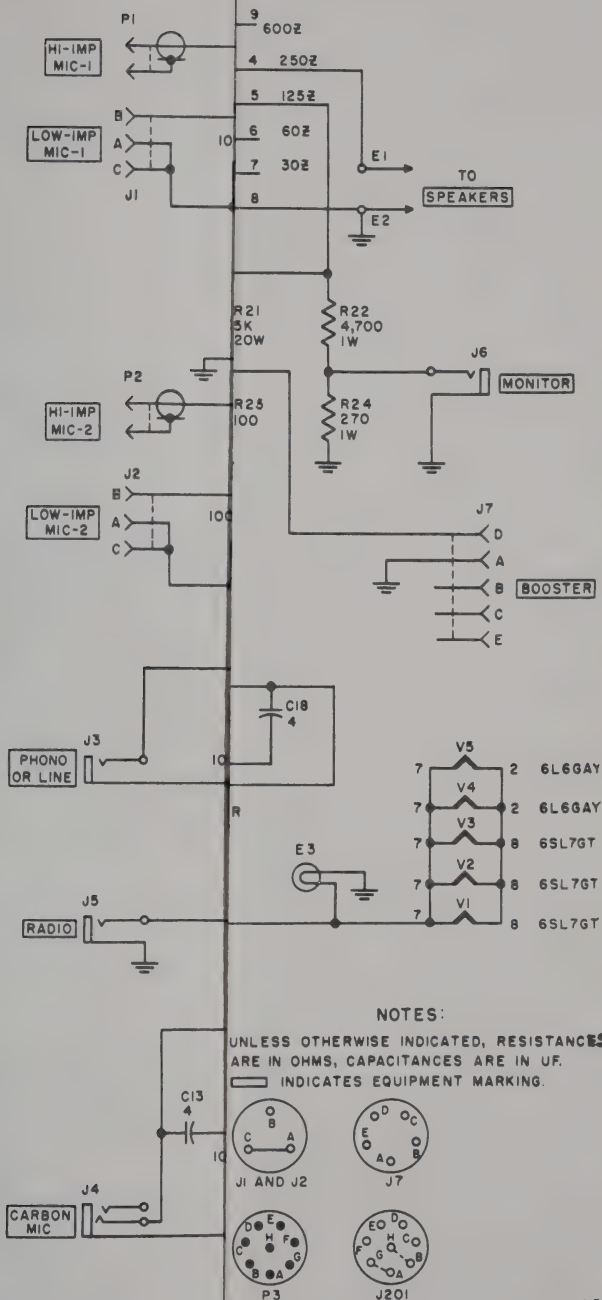


Figure 63. Amplifiers AM-20A/TIQ-2 and AM-20B/TIQ-2, schematic diagram









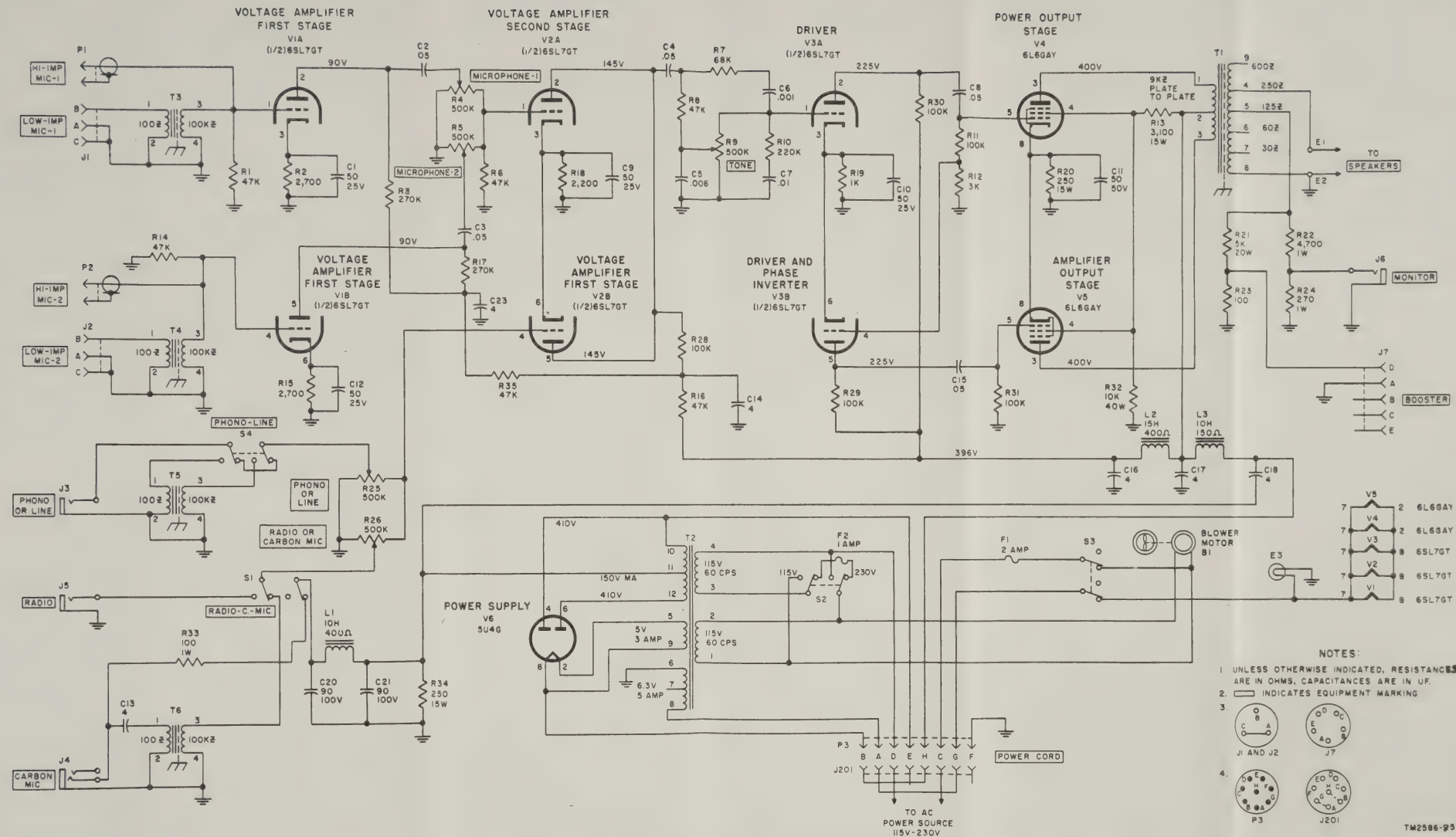


Figure 64. Amplifier AM-20B/TIQ-2 (modified), schematic diagram.



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[AG 413.47 (12 Sep 55)]



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Gen & Br Svc Sch	11-15R (2)	19-247R (2)
(5) except Sig Sch	11-16R (2)	20-7R (2)
(25)	11-57R (2)	20-300R (2)
Gen Depots (2) ex-	11-95R (2)	20-301R (2)
cept Atlanta Gen	11-127R (2)	20-511R (2)
Depot (None)	11-128R (2)	20-512R (2)
Sig Sec, Gen Depots	11-500R	44-15R (2)
(10)	(AA-AE) (2)	51-2R (2)
Sig Depots (20)	11-537R (2)	52-2R (2)
POE (2)	11-557R (2)	55-147R (2)
OS Sup Agencies (2)	11-587R (2)	57R (2)
Sig Fld Maint Shops	11-592R (2)	57-2R (2)
(3)	11-597R (2)	

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see SR 320-50-1.

